RESPONSE TO COMMENTS
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RESPONSE TO COMMENTS

Date:_____

REGARDING AN EXEMPTION FROM THE LAND DISPOSAL RESTRICTIONS UNDER THE HAZARDOUS AND SOLID WASTE AMENDMENTS TO THE RESOURCE CONSERVATION AND RECOVERY ACT GRANTED TO ENVIRONMENTAL DISPOSAL SYSTEMS, INC. FOR TWO CLASS I HAZARDOUS WASTE DISPOSAL WELLS LOCATED AT CITRIN ROAD IN ROMULUS, MICHIGAN.

INTRODUCTION

This response is issued in accordance with 40 CFR § 148.22(b), which requires public notice and an opportunity for public comment in accordance with the procedures in 40 CFR § 124.10 of the intent to deny or approve a petition to allow injection of prohibited waste under 40 CFR Part 148 subpart C. Under 40 CFR § 124.17, EPA: (1) describes and responds to all significant comments raised during the public comment period, (2) specifies which provisions, if any, of the draft decision have been changed and the reasons for the change, (3) includes in the administrative record any documents cited in the response to comments, and (4) makes the response to comments available to the public.

BACKGROUND

The Resource Conservation and Recovery Act, as amended by the Hazardous and Solid Waste Amendments of 1984, (RCRA) provided for the prohibition of hazardous wastes by a number of methods of land disposal, among them deep well underground injection. RCRA also provides for exceptions from these prohibitions. A no migration exemption is the exception established by RCRA to allow land disposal of hazardous waste to continue provided there is no threat to human health and the environment (See RCRA Section 3004(d)(1), (e)(1),(f)(2), and (g)(5), 42 U.S.C. § 6924(d)(1), (e)(1), (f)(2), and (g)(5)).

EPA determined that underground injection of hazardous waste could meet the protectiveness standard provided that EPA could review and approve injection facilities on a case-by-case basis. Accordingly, EPA promulgated regulations in 1988 establishing criteria and procedures for no migration petitions to demonstrate compliance with the protectiveness standard, 40 CFR §§ 148.20-148.24. These no migration exemption regulations prohibit the injection of hazardous waste unless a petitioner demonstrates to EPA, to a reasonable degree of certainty, that there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. As discussed below, the regulations allow a petitioner to make this demonstration by showing, among other things, that conditions at the site and the nature of the waste are such that reliable predictions can be made that injected fluids will not migrate within 10,000 years vertically upward out of the injection zone or laterally within the injection zone to a point of discharge or interface with an Underground Source of Drinking Water (USDW). The United States Court of Appeals for the District of Columbia Circuit upheld these regulations in Natural Resources Defense Council, Inc. v. EPA, 907 F.2d 1146 (D.C. Cir. 1990).

Pursuant to 40 CFR Part 148 subpart C, Environmental Disposal Systems, Inc. (EDS) submitted a petition on January 21, as amended on October 3, 6, 27, and 31, 2000; January 12, April 24, and October 16, 2001; and January 31, August 22, September 25, and October 23, 2002. EPA issued a notice of intent to grant an exemption on November 19, 2002, publishing this notice in the Federal Register (67 Fed. Reg. 77981, December 20, 2002) (Notice of Intent). EPA accepted public comments on this Notice of Intent from December 6, 2002, until October 6, 2003, holding two public hearings (on January 8, 2003 and on April 21, 2003). All comments, technical data, and facts submitted during the public comment period were evaluated and considered.

OTHER REQUIREMENTS

EDS has permits in place from EPA and the State of Michigan for construction and operation of its underground injection wells and, in addition to this exemption, is also seeking a license from the State for operation of its treatment, storage, and disposal facility under RCRA. The State of Michigan is authorized for most RCRA requirements, including corrective action requirements; but does not have primacy under the Safe Drinking Water Act (SDWA), or authorization to issue a land ban exemption determination under 40 CFR Part 148. EDS's Underground Injection Control (UIC) permits issued by EPA under the SDWA remain in place pending EPA action on its application for renewal, and contain additional requirements imposed under the SDWA UIC regulations. The UIC regulations in 40 CFR Part 146 for Class I injection wells additionally provide for injection well monitoring and construction safeguards to prevent leakage from the injection zone. As discussed in the Preamble to the final Part 146 and Part 148 regulations published July 26, 1988 (53 Fed. Reg. 28117), the regulations for the UIC Class I hazardous waste permit and no migration petition, both implemented by EPA in the State of Michigan, apply complementary, but different standards. "The standards in § 148.20 were developed to assure that no injected waste could leave the injection zone. Part 146 is meant to assure that there will be no endangerment of underground sources of drinking water (USDWs), either from injected fluid or formation fluids. With respect to injected fluids, the standards in 148 are certainly more stringent since they prohibit migration of any injected waste at hazardous levels out of the injection zone. However, endangerment encompasses a broader set of concerns and therefore warrants a broader set of regulatory controls." (53 Fed Reg. 28117, at 28133 -28134) EDS also has a permit from the State to construct a hazardous waste management facility, but still needs and has also applied for a State license to operate a hazardous waste treatment, storage, and disposal facility before it can operate its wells.

EXEMPTION DETERMINATION

EPA's decision to deny or approve a facility's no migration petition is based upon the 40 CFR Part 148 requirements that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for 10,000 years. EDS submitted a detailed technical assessment for their no migration demonstration. EDS's petition demonstrated that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous by showing, pursuant to 40 CFR §148.20(a)(1)(i), that the hydrogeological and geochemical conditions at the site and the physiochemical nature of the waste streams are such that reliable predictions can be made that fluid movement conditions are such that the injected fluids will not migrate within 10,000 years: (A) vertically upward out of the injection zone; or (B) laterally within the injection zone to a point of discharge or interface with a USDW. EPA reviewed this no migration petition

document in detail and concluded that EDS had satisfied the 40 CFR Part 148 requirements prior to proposing a decision. Additionally, all comments, technical data, and facts submitted during the public comment period were evaluated and considered by EPA before a final decision was reached on the EDS petition.

A determination that there will be no migration, with a reasonable degree of certainty, is based on the interpretation of data and the use of conservative assumptions to characterize the injection zone and to predict waste movement. The plume modeling detailed in the petition document is not intended to predict the actual plume behavior for 10,000 years, but to "bound" the area of potential plume migration, as discussed in the preamble to the 40 CFR Part 148 regulations published in the Federal Register (53 Fed. Reg. 28117, at 28126 - 28127, July 26, 1988). The petition uses a similar modeling approach to bound pressure buildup effects. Review of the EDS petition was performed by EPA staff with technical expertise to evaluate the petition and determine whether the requirements of the no migration standard were satisfied.

As set forth in the preamble to the Part 148 regulations and noted in the Notice of Intent: "The EPA's standard does not imply that leakage will occur at some time after 10,000 years. It requires a demonstration that leakage will not occur within that time frame." (53 Fed. Reg. 28117, at 28126, July 26, 1988; 67 Fed. Reg. 77981, at 77982, December 20, 2002) The Agency established the 10,000 year time frame standard, which is discussed in the preamble to the final 40 CFR Part 148 regulation (See 53 Fed. Reg. 28117). The Agency believes that the 10,000 year demonstration strikes an appropriate balance between the need to demonstrate "no migration with a reasonable degree of certainty" and the limits of the technological means available to make such a demonstration. The Agency believes that a site which could demonstrate no migration throughout a 10,000 year time period would provide containment for a substantially longer time frame, and allow for geochemical transformations which would render the waste non-hazardous or immobile.

If Congress has explicitly left a gap for the agency to fill, there is an express delegation of authority to the agency to elucidate a specific provision of the statute by regulation. Such legislative regulations are given controlling weight unless they are arbitrary, capricious, or manifestly contrary to the statute. Chevron U.S.A. Inc. v. Natural Resources Defense Council, Inc., 467 US 837, 843-844 (1984). (Chevron) Considerable weight should be accorded to an executive department's construction of a statutory scheme it is entrusted to administer. Id at 844. If the Agency's choice represents a reasonable accommodation of conflicting policies that were committed to the agency's care by the statute, it should not be disturbed unless it appears from the statute or its legislative history that the accommodation is not one that Congress would have sanctioned. (See Chevron, at 845, citing United States v. Shimer, 367 U.S. 374, 382, 383 (1961).)

EPA interprets the "reasonable degree of certainty" standard to require that the petitioner provide "reasonably trustworthy information and data such that the totality of the facts and circumstances within the Agency's knowledge be sufficient in light of its scientific and technical expertise, to warrant a firm belief that no migration of hazardous constituents from the injection zone will occur in 10,000 years." (Kay v. EPA No. 6: 90 CV582, slip op. at 5 (E.D. Tex, Aug. 3, 1993).)

EPA does not interpret the standard to require proof beyond a reasonable doubt, or to require that facts be proven to be extremely likely. The regulations at 40 CFR 148.20(a)(1), which govern this demonstration, require a showing that reliable predictions can be made based on conditions at the site.

The only changes in circumstance that have occurred since EPA issued its Notice of Intent that might affect the determination are the issuance by the State of Michigan of an extraction well permit to Sunoco Partners Marketing and Terminals, LLC (SPMT) on May 29, 2003, allowing SPMT to extract brine from several formations, including the Mt. Simon Formation, within ½ mile of the EDS wells subject to certain conditions; and the subsequent State litigation and direction on that permit. EPA has reviewed and considered that permit and comments on that permit, and has decided that issuance of such a permit should not bar granting of the exemption. Based on the evidence in the record, EPA finds that neither the permit nor the drilling of such a well will affect EDS's demonstration. It is the operation of an extraction well drilled into the injection zone within the plume of hazardous waste that would be problematic. Based on the current record, EPA can make a reliable prediction that the proposed extraction well, if ever drilled, would not be drilled and operated in formations that form the injection zone of the EDS injection wells. An extraction well drilled and operated in the shallower Lockport Formation would not impact EDS's demonstration. EPA, however, has decided to retain and clarify the condition proposed in its Notice of Intent to terminate the exemption if an extraction well is drilled within the area of review (AOR) into the injection zone, penetrated by well #2-12 at a depth of 3,369 feet, and is used for extraction from any strata within the injection zone. Under current conditions, EDS's demonstration meets the criteria at 40 CFR § 148.20.

COMMENTS AND RESPONSES

I. Concern about Hazardous Waste Management in Romulus

1. Comment: Contamination of well waters causes illness.

Response: EPA agrees that contaminants in well water can cause illnesses. However, EPA concluded that EDS has demonstrated, to a reasonable degree of certainty, that hazardous waste will not migrate from the injection zone for at least 10,000 years. Based on this demonstration of no migration, EPA believes that area water wells are not in danger of contamination from the EDS injection wells.

2. Comment: Hazardous waste is dangerous whether it is seen or unseen. If it has to be buried, why here in a populated area in a state surrounded by water?

Response: As a preliminary clarification, EDS will not bury the hazardous wastes. It will inject the wastes through an injection well into deep underground formations that should contain that waste below a depth of 3,000 feet.

The siting requirements for Class I hazardous injection wells are set forth in 40 CFR § 146.62, which describes requirements related to the suitability of the injection formation. As discussed in the preamble of the 40 CFR Part 148 regulations, "...the siting requirements of § 146.62 with regards to injected waste are either subsumed in the standard set in § 148.20 or rendered unnecessary by a successful demonstration. Moreover, the § 148.20 requirements are more stringent than the § 146.62 requirements." (53 Fed. Reg. 28117, at 28128, July 26, 1988) EPA considered siting requirements prior to issuing UIC Class I hazardous waste well permits for the EDS wells, and during the technical review of the no migration demonstration to confirm there would be no migration of waste from the injection zone. EPA has determined that siting requirements have been met. In issuing its permit for construction, the State also considered its siting criteria. Moreover, deep well injection is not like burying waste near the Earth's surface. When wastes are buried near the surface, they are in a zone in which there is significant movement of ground water. Rain water percolates into the earth and flows through shallow soil and rock to areas of discharge. At the depths that EDS would inject waste, the rate of ground water flow is less than 6 inches per year and the nearest possible discharge areas are over 200 miles away. Therefore, hazardous constituents will not be flushed away to be discharged somewhere else.

3. **Comment:** EPA has not provided a credible answer as to how the public's safety will be guaranteed.

Response: Based on EPA's technical review, EDS met all regulatory requirements and demonstrated that, to a reasonable degree of certainty, there would be no migration of hazardous constituents from the injection zone for 10,000 years. By meeting this standard, EPA has determined that the EDS injection wells are protective of human health and the environment.

4. **Comment:** Will EPA grant the exemption because it is unconcerned about toxic waste in Michigan?

Response: EPA is concerned about the disposal of toxic waste and has published regulations to protect public health from toxic wastes. The regulations at 40 CFR Parts 146 and 148 and the requirements for a demonstration of no migration protect public health. EPA is granting the exemption because it has determined that EDS's petition met the criteria for the demonstration at 40 CFR Part 148 subpart C. These criteria, as well as the RCRA statute, recognize that hazardous waste will be injected, but allow for injection that is protective of human health and the environment.

II. How will EPA Prevent Injury from Disposal of Wastes by EDS?

1. Comment: This may not affect our generation, but we must protect the earth for the generations to come. Toxic pollution of our water and earth is NOT the legacy we want to leave our future generations. What options are available to EPA to guarantee the EDS well will not pose a threat, in the short and long term, to the public health and welfare of the surrounding communities?

Response: EPA agrees we must protect the earth for future generations. EDS has demonstrated that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous by showing, pursuant to 40 CFR §148.20(A)(1)(i), that the hydrogeological and geochemical conditions at the site and the physiochemical nature of the waste streams are such that reliable predictions can be made that fluid movement conditions are such that the injected fluids will not migrate within 10,000 years: (A) vertically upward out of the injection zone; or (B) laterally within the injection zone to a point of discharge or interface with a USDW. Accordingly, EPA has determined that the EDS injection wells are protective of human health and the environment. Based on the no migration petition review, the local drinking water supply and Great Lakes watershed are not in danger of contamination from the proposed injection. EPA also notes that in meeting the no migration standard, the EDS wells satisfied the hazardous waste injection well construction requirements of 40 CFR § 146.65. 40 CFR § 146.68 requires monitoring and testing. The UIC regulations in 40 CFR Part 146 for Class I hazardous waste injection wells provide for injection well monitoring and construction safeguards to prevent leakage from the well and the injection zone, and EPA reviews monthly operating reports and reports on periodic testing. In addition, the EDS facility will be inspected quarterly.

2. Comment: Injecting untreated hazardous waste into the ground is the most primitive form of waste disposal still allowed. The long term costs for the use of this technology have not been determined. There have not been enough studies to determine the safety of disposing of hazardous materials through the EDS well.

Response: In general, deep injection wells have demonstrated that they are protective of the environment. The regulations and the demonstration are intended to protect human health and the environment and prevent the costs associated with pollution of USDWs. Geological confinement in the deep subsurface fails only when the layers overlying the injection interval are cut by a feature, such as an open fracture or unplugged well, which allows liquids to pass through them without hindrance.

The land ban demonstration considered all known information about the geology in the area of the facility, including a considerable amount of new information gathered during construction of the wells. No evidence was found which suggests that there are features which might allow wastes to pass through the 3,000 feet of stratified sedimentary rock which separates the injection zone from any fresh water aquifers.

There have been quite a number of studies, both by the federal government and individual states. One of the earliest EPA studies was "The Report to Congress: Waste Disposal Practices and Their Effects on Ground Water" [EPA-570/9/77/001], January 1977, Chapter XIII of which is devoted to injection wells. Another major EPA report was issued in June 1977 entitled "Review and Assessment of Deep-Well Injection of Hazardous Waste" [EPA-600/2-77-029], which consists of four volumes and over 1400 pages. Another EPA report is entitled "Report to Congress on Injection of Hazardous Waste," dated May 1985; this report identifies all deep well injection failures and concludes that adherence to the UIC regulations would have prevented them. It is available on the EPA web site at http://www.epa.gov/safewater/uic/pdfs/19506.pdf in Adobe Portable Document File (PDF) format. The U.S. General Accounting Office produced an independent report in August 1987 entitled "Hazardous Waste: Controls Over Injection Well Disposal Operations" [GAO/RCED-87-170]. More recently EPA published a "Study of the Risks Associated with Class I Underground Injection Wells [EPA 816-R-01-007]" in March 2001; this report is also available on the EPA web site at http://www.epa.gov/safewater/uic/classonestudy.pdf also in PDF format. The national UIC web page lists many other reports related to this program which you can view online. Please check http://www.epa.gov/safewater/uic/qry_smallAllUIC_Files.html.

3. Comment: Storing hazardous chemicals underground is unpredictable and subject to abuse and greed.

Response: EPA disagrees that injection of hazardous waste is unpredictable. The Agency believes that properly constructed and operated Class I hazardous waste injection wells are a safe and effective disposal technology. The RCRA land disposal restrictions (LDR) prohibit the injection of hazardous waste unless a petitioner demonstrates to EPA that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. Based on its review, EPA concluded EDS has demonstrated that, to a reasonable degree of certainty as required by 40 CFR Part 148, wastes will not migrate from the injection zone for at least 10,000 years.

EPA notes that the approved no migration petition provides for specific conditions such as rate and pressure limits as well as a waste code list

which limit what wastes and how much can be disposed down the EDS injection wells. Compliance with the no migration petition conditions are also verified through EPA inspections and review of all monitoring and other reports. Furthermore, civil and criminal penalties are available for violations of the UIC regulations.

4. Comment: Inorganic salts dissolved in brine can cause equipment corrosion and fouling.

Response: EPA notes that prior to EPA's issuance of the Class I UIC hazardous waste injection permits, the EDS wells were determined by EPA to satisfy Class I hazardous waste injection well construction requirements in 40 CFR § 146.65, which include consideration of the corrosiveness of the injected fluid and formation fluids and the chemical composition of the injected fluid, as well as the materials used to construct the well.

5. Comment: Disposal of liquid waste by insertion into high pressure wells has been abandoned because of its potential for harm to the environment, and most importantly, the people. The technology has not changed because it has not been pursued.

Response: The UIC regulations limit injection pressure on Class I wells to levels that will prevent the fracturing of injection and confining zones. The pressure used to inject will be less than 1,000 psi at the well head. The pressure of liquid already in the injection zone, called hydrostatic pressure, was measured and found to be 1,983 psi at a depth of 4,265 feet, near the middle of the injection zone. The existing hydrostatic pressure will only be increased by about 900 psi. Tests in which water was injected at pressures high enough to fracture the rock of the confining zone showed that fractures will not be formed using 900 psi injection pressure. The injected waste will travel within the existing pore system without creating fractures.

EPA further disagrees, noting that about 50 Class I restricted hazardous waste injection well facilities currently operate in the U.S. under approved no migration petitions. Additionally, since the implementation of the federal UIC program, there have been no confirmed cases of USDW contamination due to hazardous waste injection through a properly operated Class I well. The Agency continues to believe that properly constructed and operated Class I injection wells are a safe and effective disposal technology. Moreover, numerous advances have been made in monitoring and regulation of this technology since waste disposal through injection became common in the 1960's.

6. Comment: There is not something that you can fix if hazardous pollutants leak into the ground.

Response: The purpose of the no migration standard for hazardous waste disposal is to avoid the necessity of cleaning up pollution. EPA has reviewed the relevant facts in detail and finds that EDS has met the no migration standard. The surface facility will be operated under a RCRA license with requirements for safeguards which will ensure protective management prior to injection and corrective action plans to address any failure.

7. Comment: The unique risks posed by commercial hazardous waste injection wells are not worth taking. There are little or no benefits, economic or otherwise, to putting this well in the Romulus community. However, the environmental and economic risks are many.

Response: EPA disagrees. There are no unique environmental risks posed by commercial hazardous waste disposal wells. Liquid wastes behave similarly regardless of their sources. The Agency believes that properly constructed and operated Class I injection wells are a safe and effective disposal technology as regulated today. These wells must be operated within established requirements. Compliance with the UIC regulations minimizes the risks associated with disposal of hazardous wastes. A review of well failures made during the development of the regulations showed that the regulations which were then developed and are now in force would have prevented these failures. Very few historical failures had environmental impacts, and there have been no failures resulting in contamination of underground sources of drinking water since implementation of the UIC regulations.

8. Comment: Why would EPA grant an exemption for something that is banned?

Response: The ban itself provides for the exemption. RCRA, among other things, authorized EPA to allow methods of land disposal determined to be protective of human health and the environment for as long as the waste remains hazardous, taking into account the long-term uncertainties associated with land disposal, the goal of managing hazardous waste in an appropriate manner in the first instance, and the persistence, toxicity, mobility and propensity to bioaccumulate of such hazardous wastes and their hazardous constituents. The standard for deep well injection is addressed in RCRA Section 3004 (f) and (g). Under Section 3004(g), a method of land disposal may not be determined to be protective of human health and the environment (except with respect to hazardous waste which has complied with the pretreatment regulations) unless, upon application by an interested person, it has been demonstrated to the Administrator, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the disposal unit or injection zone for as long as the wastes remain hazardous. EPA promulgated the standards at 40 CFR Part

148 subpart C pursuant to these statutory provisions. EPA has determined that EDS's proposed injection meets those standards.

III. The Land Ban Process

1. Comment: What is a demonstration of no migration?

Response: A demonstration of no migration is the demonstration under 40 CFR § 148.20(a) which requires persons seeking an exemption from the LDR for injection of restricted hazardous waste into an injection well to submit a petition demonstrating that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. The regulations at 40 CFR Part 148 are promulgated under RCRA §3004 (f) and (g). EDS met this demonstration by submitting a petition pursuant to 40 CFR §148(a)(1)(i) showing that the hydrogeological and geochemical conditions at the site and the physiochemical nature of the waste stream(s) are such that reliable predictions can be made that fluid movement conditions are such that the injected fluids will not migrate within 10,000 years: (A) vertically upward out of the injection zone; or (B) laterally within the injection zone to a point of discharge or interface with an underground source of drinking water (USDW), and meeting the other requirements of 40 CFR Part 148 subpart C.

2. Comment: Has anyone ever injected these wastes for 10,000 years to test and make sure there is not a leak?

Response: The basis for the 10,000 year time frame was discussed in the preamble of the final rule of the 40 CFR Part 148 regulations: "... the Agency specified the 10,000 year time frame not because migration after that time was of no concern, but because it believed a site which could meet a 10,000 year time period would provide both containment for a substantially longer time frame, and allow for geochemical transformations which would render the waste non-hazardous or immobile." (53 Fed. Reg. 28117, at 28126, July 26, 1988). EDS has demonstrated that hazardous waste will not migrate from the injection zone for at least 10,000 years to a reasonable degree of certainty. This determination is based on the interpretation of data and the use of conservative assumptions to characterize the injection zone and to predict waste movement. EPA reviewed in detail the no migration petition document and concluded that EDS has successfully provided this demonstration.

3. Comment: Once salt mining activities are started they can't be stopped due to grandfathering clauses. If the valve for this well gets turned on, it will not get turned off. The well will get grandfathered in, just like the salt mines in the area.

Response: EPA has included a condition terminating the exemption if an extraction well is drilled within the AOR into the injection zone, penetrated by well #2-12 at a depth of 3,369 feet, and is used for extraction from any strata within the injection zone. With respect to the hazardous waste injection wells, the regulations at 40 CFR Part 148 subpart C allow EPA to assess new information to determine if the basis for approval of the petition remains valid. The no migration regulations do not contain a "grandfather clause" that would allow an injection well to continue to operate if it did not meet the appropriate regulatory requirements. Operators who did not have approved petitions before the ban date for their waste disposal were required to cease disposal as of those dates. The regulations at 40 CFR §148.24 allow the Director to terminate the exemption if, among other things, new information shows that the basis for approval of the petition is no longer valid. To obtain an exemption from the LDR, EDS also had to make the demonstration under 40 CFR Part 148 subpart C. The Agency has authority under 40 CFR § 148.23 to require a new demonstration if it determines that the basis for approval of a petition may no longer be valid. While the exemption determination contains a 20 year term based on the period of disposal modeled in the demonstration, the actual term of operation will probably be governed by EDS's UIC permit and State RCRA hazardous waste license, if issued, and can also be cut short as set forth at 40 CFR § 148.24.

4. Comment: A commentor noted that a Senate report declared that land disposal is the least favored means of waste management, and concluded that deep well injection is an unfavorable option for disposing of hazardous wastes and that exemptions should be used sparingly.

Response: EPA has published two reports to Congress that confirm that underground injection using deep wells is an environmentally sound alternative for the disposal of waste when operated in accordance with the UIC regulations. Furthermore, exemptions are granted sparingly. EPA has previously received petitions from five other companies in Michigan, but has granted an exemption only to two of them. Two of the companies withdrew their petition when informed that an exemption would not be granted unless certain additional conditions were met; another ceased operation before a decision was made.

Under the Land Disposal Flexibility Act of 1996, EPA was required to complete a study of the risks to human health and the environment associated with hazardous waste disposal practices and directly related to certain wastes managed by surface impoundments and Class I injection wells regulated under the Underground Injection Control (UIC) program. The results of this study were published in March, 2001 (EPA 816-R-01-007). The final sentence in the "Conclusions" section states:

"The EPA has no reason (sic) but to conclude that existing Class I UIC regulatory controls are strong, adequately protective, and provide an extremely low-risk option in managing the wastewaters of concern." This report cites a separate report[1] which found the probability of leaks to a USDW from various causes to be, in all cases, less than one in one million.

5. Comment: The cone of endangering influence diagram demonstrates that many communities will be impacted by the exemption and will lose their rights to use this subsurface resource. This may materially impact their investments and their property. Due to the destruction of this natural resource and other impacts that will result, it appears that a National Environmental Policy Act (NEPA) review should be undertaken for the major federal action.

Response: The effects of the cone of endangering influence are only relevant to transmissive fractures and holes drilled into the injection formation. This formation is fairly deep and, as discussed later, there is a reasonable degree of certainty that it will not be drilled into for the extraction of minerals. Consideration of no migration petitions is subject to a well recognized exemption to NEPA's procedural requirements. Where EPA's adherence to substantive and procedural standards ensures full and adequate consideration of environmental issues, EPA's implementation of statutes enacted to protect the environment is functionally equivalent to the environmental review NEPA requires of other federal agencies. See, e.g., Texas Committee on Natural Resources v. Berglund, 573 F.2d 201, 207-208 (5th Cir. 1978); Environmental Defense Fund v. EPA, 489 F.2d 1247, 1257 (D.C. Cir. 1983).

The maximum predicted cone of endangering influence was determined to be approximately 6.1 miles from the injection wells. This pressure buildup demonstration represents the worst-case potential for pressure buildup in the reservoir through the use of conservative data and assumptions. It indicates that waste will not exit the injection zone. EDS demonstrated that increased reservoir pressure would not cause migration of hazardous constituents from the injection zone.

The results of the modeling show that the proposed injection will be protective of human health and the environment. The exemption is based on meeting a number of specific standards, including separation of the injection zone from USDW by a confining zone and at least one sequence

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[1]Rish, W.A., T. Ijaz, and T.F. Long. *A Probabilistic Risk Assessment of Class I Hazardous Waste Injection Wells*. Draft. 1998.

of permeable and less permeable strata. The injection zone defined for the facility meets the standards included in the regulations.

The exemption does not determine property rights. It is a determination on whether the proposed injection meets the standard for an exemption from the LDR. As with the issuance of a UIC permit, it does not convey any property rights or any exclusive privilege and does not authorize any injury to person or property or invasion of other private rights, or any infringement of State or local law or regulations. To the extent, if any, that property rights are affected by the proposed injection, the granting of this exemption does not prevent them from being addressed in a separate forum.

6. Comment: Even without the exemption EDS may inject non-restricted hazardous wastes and non-hazardous wastes into its wells.

Response: Because they are not restricted under the LDR, EDS may inject these wastes without the exemption after it has received authorization to inject from both EPA and the State. Even with respect to non hazardous waste and non-restricted hazardous waste EDS needs a permit and/or license from the State. The granting of this exemption does not override or satisfy any other permitting or other requirements to which EDS's operations may be subject.

IV. Local Ordinances

1. Comment: There are no local ordinances that would allow local government to regulate the facility or well construction. Local units of government are preempted from regulating hazardous waste facilities by Michigan's hazardous waste law.

Response: In reviewing EDS's land ban exemption and underground injection control permit, EPA has applied the exacting requirements of RCRA and SDWA and their implementing regulations. EPA's determinations on these matters do not mean that the wells cannot be subject to other requirements, including licensing requirements. Nor is this determination a ruling on the applicability of other requirements.

V. Modeling and Simulation

1. Comment: EDS geologists say it is safe, they don't really know. Scientists can't predict earthquakes, volcanoes or even the next day's weather accurately.

Response: EPA disagrees that movement of liquids in the deep subsurface cannot be predicted to a reasonable degree of certainty. EPA reviews injection facilities on a case-by-case basis. A determination that there will be no migration, with a reasonable degree of certainty, is based on the interpretation of data and the use of conservative assumptions to characterize the injection zone and to predict waste movement. Fluid-flow modeling is a well-developed science that has been used by the petroleum industry for many years, as discussed in the preamble to the 40 CFR Part 148 regulations (See 53 Federal Register 28117). A similar modeling approach is utilized to bound pressure buildup effects in the petition document. Review of the EDS petition was performed by staff with technical expertise to evaluate the petition and determine whether the requirements of the no migration standard were satisfied. The potential for seismic activity of the region was considered by EPA prior to approving the UIC permit in accordance with 40 CFR § 146.62(b)(1).

2. Comment: A building commission just informed me that they cannot give me assurance of a 100 year life for a building. We know from basic earth science that nothing is solid. The Mt. Simon sandstone will not hold up for 10,000 years, it may not hold up for 100 years. It seems pretty audacious to accept a assurance of containment for 10,000 years.

Response: The geological structure of the earth is very different from buildings of the type currently being constructed. With the exception of the unconsolidated glacially deposited material in the uppermost 100 feet, the earth materials from the Mt. Simon Sandstone to the surface have been there for many millions of years. The Mt. Simon is approximately 500 million years old. Physical scientists and engineers have been studying the earth's structure and fluid flow within it under many conditions for well over 100 years, and a lot of knowledge is available. Regions are periodically raised, with erosion removing older rock layers, and lowered, allowing the deposition of additional rock layers. The Michigan Basin has been both raised and lowered since the Mt. Simon Sandstone was deposited. The fact that the Mt. Simon has not been raised sufficiently to be eroded through the course of 500 million years strongly suggests that it will last, as it is, for many millions of years. The sands, silts, and shales making up the Mt. Simon are very stable. There will be no permanent effects on the rocks as a result of the proposed injection.

3. Comment: Despite the use of science by geologists in the oil industry, many dry wells are drilled. This indicates that geology as a science is unreliable.

Response: Although the use of science, empirical knowledge, and technologies based on science greatly increases the probability, many variables must come together in order to find oil. The prediction of flow in a particular aquifer is simple in comparison.

4. **Comment:** Sound science cannot completely eliminate risk, which is why they use terms like "reasonably predicted" and "reliably predicted." The fact that risk still exists is proven by the occurrences at Winona, Texas, and Love Canal, New York.

Response: EPA requires the petitioner to demonstrate, within current scientific and technical limits, that the fluid will not migrate out of the injection zone for 10,000 years. Since the implementation of the federal UIC program, there have been no confirmed cases of fresh water aquifer contamination due to hazardous waste injection through a properly operated Class I well. The EDS decision is based on the technical demonstration of no migration, which was made in accordance with 40 CFR Part 148 standards. The UIC regulations provide additional safeguards against the potential for well failures to adversely impact the environment. As discussed below, well construction, operation, testing, monitoring and reporting requirements in the UIC permits and regulations can detect and avert potential problems. Based on EPA's technical review, EDS met the requirements of 40 CFR Part 148 subpart C and demonstrated there would be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. Because it meets this standard, EPA has determined that the proposed EDS injection is protective of human health and the environment.

The examples provided in this comment are not instances of leaking regulated underground injection wells. Communication with EPA Region 6 in Dallas, Texas, confirmed that ground water contamination at the Winona, Texas, injection well facility was not a result of upward migration of injected waste. An expansion joint was improperly installed in the sump of the drum handling building at the Winona facility which allowed contaminants from spills to seep into the ground. After this error was identified, this sump was reconstructed so that there was no gap for fluids to seep through and remediation of the ground water was initiated. The plume is being recovered through a trench collection system and injected through one of the old deep wells. No contaminated ground water has left the Winona facility. EPA notes that the contamination at Love Canal resulted from uncontrolled surface releases before the creation of EPA.

5. **Comment:** A government scientist reports that if you run existing multi-phase models long enough, the results show that non-aqueous phase liquids (NAPL) will completely drain from an unsaturated zone, which is contrary to field and experimental observations.

Response: It must be pointed out that the model used in the EDS demonstration is not a multiphase model and the operation is not in the unsaturated zone. Therefore, the statement has no direct implication for EDS's modeling

effort. EPA also notes that the problem described concerns the difficulties of quantifying the effects of factors which cause attenuation of constituents in the plume. The no migration demonstration assumes that there are no factors which cause retention of hazardous materials and thereby maximizes the distance of plume movement.

VI. EPA Review of the No Migration Demonstration

1. Comment: One commentor requested to see samples of the rock cuttings.

Response: Core data reports containing the information needed to develop the demonstration were included in Appendix 3 of the EDS no migration petition. Descriptions of the cuttings from the intervals which were not cored are contained in the completion reports for the two wells. The completion reports are Appendices 6 and 7 of the EDS no migration petition. This information was reviewed in detail by EPA in evaluation of the geologic formations at the EDS facility. The drilling and completion reports for each injection well contained a summary of the daily drilling activities. The complete administrative record, including core reports and summary of daily drilling activities, was available for review at EPA's Region 5 office during the public comment periods. Reports as required by § 146.44 were submitted. The regulations do not require submission of either core or cutting samples. The cores and samples have been preserved. The cuttings and cores from the Wahrman Road well are in EDS's immediate possession. The cores from the wells at the Citrin Drive facility remain stored at the Core Laboratories facility in Houston, Texas.

2. Comment: EPA has created a travesty of science.

Response: EPA disagrees that science was ignored in the no migration petition review process. EPA's decision to deny or approve a facility's no migration petition is based upon a detailed technical assessment of the no migration demonstration according to the requirements of 40 CFR Part 148. In making this decision, EPA consulted with the U.S. Geological Survey (USGS) and the Lawrence Berkeley National Laboratory (LBNL). The EPA decision-making process involves broad public involvement and thorough documentation. Based on EPA's technical review, EDS met the requirements of 40 CFR Part 148 subpart C.

3. Comment: Fluid flow models used in the petroleum industry may not be relevant to a well that could inject over 500 different toxic chemicals.

Response: Comments regarding the applicability of models to demonstrate the no migration standard were evaluated prior to the promulgation of the Final Rule for Hazardous Waste Disposal Injection Restrictions and

Requirements for Class I wells. The application of models is further discussed in the preamble of the 40 CFR Part 148 regulations (See 53 Fed. Reg. 28117, at 28127, July 26, 1988). As discussed in the Agency's response to those comments, there is a wide range of models that provide the capability to analyze pressure buildup, lateral waste migration, vertical fluid permeation into overlying confining material, and leakage through defects in overlying aquifers. Models, despite their origin or computational approach, which predict the items described above are acceptable to EPA as long as they are properly verified, validated, and calibrated to the site as required in 40 CFR §148.21(a)(3).

As indicated in the preamble to the Final Rule, EPA found that models are appropriate for a no migration demonstration, emphasizing further that conservative modeling can be used to "bound the problem," therein forming the basis for a "no migration" demonstration. By "bounding," the modeler essentially predicts what will not occur through the use of conservative data and assumptions. Where some uncertainty exists for site-specific data, sensitivity analyses, per 40 CFR § 148.21(a)(6), provide a range of error, or worst case demonstrations, to further "bound" model predictions.

The modeling of the injection system proposed by EDS is based strictly on physical containment of the wastes by multiple barriers. Detailed knowledge of the chemical makeup of the injectate is not required because EDS demonstrated that the most mobile constituents would not migrate out of the injection zone in concentrations which would be hazardous if the migrating constituents are the most toxic which might be injected. In modeling, only the final physical characteristics of the waste plume, such as density and viscosity, are required. The EDS lateral waste plume demonstrations included a range of density values to bound the movement of the waste. Analytical models were used to simulate waste plume movement and the maximum pressure buildup in the injection interval. The analytical model used for the demonstration has been verified and validated. The codes were verified as capable of solving the necessary equations and validated as appropriate for application to the EDS land ban demonstration. Based on EPA's technical review, EDS met the requirements of 40 CFR Part 148 and demonstrated there would be no migration of hazardous constituents from the injection zone. By meeting this standard, EPA has determined that the EDS's proposed injection is protective of human health and the environment.

VII. The Geological Basis for the Modeling

1. Comment: The assumptions used in the demonstration seem to rely on hopeful speculation rather than fact.

Response: EPA disagrees. The LDR prohibit the injection of hazardous waste unless a petitioner demonstrates to EPA, to a reasonable degree of certainty, that there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. As discussed above, EPA interprets the "reasonable degree of certainty" standard, as used in Section 3004 of RCRA and 40 CFR Part 148, to require that the petitioner provide 'reasonably trustworthy information and data such that the totality of the facts and circumstances within the Agency's knowledge be sufficient in light of its scientific and technical expertise, to warrant a firm technical judgement that no migration of hazardous constituents from the injection zone will occur in 10,000 years.' A no migration determination is based on the interpretation of data and the use of conservative assumptions to characterize the injection zone and to predict waste movement. EPA reviewed in detail the no migration petition document and concluded that EDS has demonstrated, to a reasonable degree of certainty, that waste will not migrate from the injection zone for at least 10,000 years. By meeting this standard, EPA has determined that the EDS's proposed injection is protective of human health and the environment.

2. Comment: EDS's petition should not be approved just because it meets minimum technical standards. There should be a comprehensive review.

Response: Characterizing EDS's demonstration as "just meeting minimum standards" misconstrues the standard. There are margins of safety built into the demonstration and the result shows that migration will cover a small fraction of the distance from the injection interval to the base of the USDWs. The comprehensive review of considerations concerning the migration of waste constituents showed that the wastes injected will migrate vertically less than 250 feet during the 10,000 years while there is separation of more than 3,500 feet between the injection interval and any point of discharge out of the injection zone and that the wells' elements are suitable for use as assembled.

For the EDS wells, EPA, in consultation with USGS and LBNL, reviewed in detail the no migration petition and concluded EDS has demonstrated that, to a reasonable degree of certainty as required by 40 CFR Part 148, wastes will not migrate from the injection zone for at least 10,000 years. EPA also notes that prior to EPA's issuance of the Class I UIC hazardous waste injection permits, the EDS wells were determined by EPA to satisfy Class I hazardous waste injection well construction requirements in 40 CFR § 146.65, which include consideration of the corrosiveness of the injected fluid and formation fluids and the chemical composition of the injected fluid, as well as the materials used to construct the wells.

3. Comment: Drawing conclusions for the entire formation located 4,000 feet below the surface for several miles from these core samples, inches in diameter, appears to be risky in relation to the harm which may be caused in the event that a fissure or connection exists with other subsurface resources. The applicant should be required to provide a representative core sample from the entire zone of influence.

Response: EPA disagrees. In reviewing the no migration petition, EPA considered all available injection zone data including cores, falloff tests, geophysical measurements of rock and fluid properties, and geologic data such as thickness and structure maps, and cross sections. EPA evaluated the injection and confining zones by using information from both EDS wells and other area wells. Core samples from the entire zone of endangering influence[2] are not required to evaluate the injection zone. The core samples collected during the drilling of the wells meet the requirements of 40 CFR § 146.66(b) for the construction of wells proposed for hazardous waste disposal. Information from analysis of the core samples supports the demonstration of no migration, but is not by any means the sole basis for the proposed decision. A number of complementary standard methods used to evaluate subsurface geology were used to develop and evaluate the no migration demonstration. Additionally, any pressure buildup in the injection zone that is not consistent with the computer simulation will be detected on the pressure falloff tests that EDS is required to perform annually.

4. Comment: How many core samples were reviewed? How was the adequacy of these determined?

Response: Regulations at 40 CFR § 146.66(b) require that cores be cut from the injection and confining zones from each Class I well drilled for the disposal of hazardous wastes. Full well bore cores were cut from 1) the confining layer in the # 1-12 well from 3,060 to 3,090 feet in depth; 2) the injection zone in the #1-12 well from 4,156 to 4,186 feet in depth; 3) the confining layer in the #2-12 well from 2,505 to 2,535 feet in depth; 4) the injection zone in the #2-12 well from 4,127 to 4,148 feet; 5) the injection zone in the #2-12 well from 4,245 to 4,271 feet in depth; 6) the confining layer in the well on Wahrman Road from 3,475 to 3,535 feet in depth; 7) the injection zone in the well on Wahrman Road from 3,715 to 3,775 feet in depth; 8) the injection zone in the well on Wahrman Road from 3,830 to 3,890 feet in depth; 9) the injection zone in the well on Wahrman Road from 3,954 to 4,013 feet in depth; and 10) the injection zone in the well on

[2]The cone of endangering influence is that volume, roughly conical in shape, within which pressure caused by injection might be sufficient to cause either waste or formation water to flow from the injection zone through an open conduit into the lowermost USDW.

Wahrman Road from 4,254 to 4,294 feet in depth. EPA determined that the information submitted by EDS was sufficient to demonstrate that the injection and confining zones meet the regulatory criteria of 40 CFR § 146.66(a). The coring program meets the requirements cited above because they require that single cores from each of the injection zone and confining zone be cut during the drilling of each hazardous waste disposal well. Because the collection of cores also includes one from the more distant well, it is possible to show that the reservoir characteristics are extensive. The data obtained from making measurements of core properties, combined with log and pressure transient test data allowed EDS to simulate the effects of injection through one of the wells and closely match the effects measured in the second well.

5. Comment: How was the information obtained from the core samples extrapolated to the entire area?

Response: The porosity of the cores and permeability in several directions were measured. In addition, these measurements were correlated to geophysical log data from both these wells, the well which EDS drilled on Wahrman Road, and other wells in the area to show that reservoir properties are consistent over a wide area. In reviewing the no migration petition, EPA considered all available injection zone data including cores, falloff tests, logs, and geologic data such as isochore and structure maps and cross sections. In addition, the drilling and completion reports for each injection well contained a summary of the daily drilling activities. EDS demonstrated that the confining shales are laterally continuous with sufficient thickness and low transmissive properties to restrict vertical waste movement. This demonstration was made by using well logs and core analysis to characterize the confining shale.

6. Comment: Please define the rules and steps involved in the geological study process, including the length and breadth of tests and a full listing of the geological characteristics that make a deep well unsuitable. Include a listing of those geological characteristics common to southeastern Michigan.

Response: Information to be submitted in support of a no migration petition, inclusive of geological data, is detailed in 40 CFR §§ 148.20 - 148.22. Additional information required for a Class I hazardous waste injection well permit is detailed in 40 CFR §§ 146.66 and 146.70. A geological review of a no migration petition includes evaluation of local and area geology and seismic and hydrogeologic conditions. Data evaluated in the geologic review process may include, but is not limited to, open hole and cased hole logs of the injection wells and other area wells, such as temperature, neutron, electrical, and radioactive tracer logs; confining and injection zone core data; geological cross sections based on area wells; well location, structure, and net formation thickness maps; consulting

geological reports; regional hydrogeological reports; USDW base maps; injection zone water samples; drilling and completion reports for area wells; scout tickets; plugging and abandonment reports; State completion reports for other wells; offset well production and injection data; seismicity reports; seismic surveys and cross sections; USDW ground water sample data; and ground water monitoring well reports. Geological review is generally completed prior to performing the modeling for the no migration demonstration.

Unacceptable primary geological characteristics for a waste disposal injection zone would include limited areal extent of injection zone formations, low fluid permeability in the injection zone, lack of a containment zone above the injection zone, and complex geological structure including transmissive fractures in the injection zone extending up into the confining zone.

Geological characteristics common to southeastern Michigan include simple, sedimentary structure with a low rate of dip to the northwest, no known transmissive faults or fractures, deep reservoir zones in a formation mixing sandstones, shales, and carbonate rocks overlain by mostly dense carbonate rock which also includes several sequences of more and less permeable zones.

7. Comment: A note on each log says that "in making interpretations of logs our employees will give the customer the benefit of their best judgement. But since all interpretations are opinions based on inferences from electrical or other measurements, we cannot, and do not guarantee the accuracy or correctness of any interpretation. We shall not be liable or responsible for any loss, cost, damages or expenses whatever incurred or sustained by the customer resulting from any interpretation made by our employees." The interpretations may not, and in many cases do not, represent actual fact. The collection of subterranean data must be carried out in a normal and scientific fashion.

Response: The note referenced is the standard disclaimer made in regard to interpretations based on log measurements. The measurements recorded on the logs are accurate and are reproducible within the limits of statistical variation. Parts of each well are logged twice to ensure that the tools are functioning correctly. Some interpretation of all scientific data is normally required and errors in interpretation are possible. The disclaimer is made to protect the logging company against errors made by its own employees. EDS is responsible for the accuracy of interpretations based on the geophysical measurements recorded on the logs. The logs made of the well bores at the EDS facility are the normal, scientific means of collecting subsurface data. The log data were combined with core data, pressure transient and other test results to minimize the potential for errors and to

create the most likely geological model for the disposal system. Geological information provided in the EDS no migration document satisfied requirements for petition geological data as detailed in 40 CFR §148.20 and §148.21. Based on EPA's technical review, EDS met the requirements of 40 CFR Part 148 subpart C.

8. **Comment:** One commentor asserts that, on two of the logs he examined, the header clearly stated that the point of origin was in Illinois, not Romulus, Michigan. The commentor asks why he should believe the data if the header is incorrect.

Response: EPA and EDS each checked their copies of the logs and could not find the headers referenced. EPA knows that the logs originated from the EDS wells as EPA staff witnessed some of the logging of well #2-12 and the logs are all consistent with those which were observed to have been run there. The log measurements themselves can be compared to the measurements from nearby wells to check for consistency. EPA reviewed the log measurements carefully, searching wells for missing sections that might be evidence of movement on faults.

9. **Comment:** Were the geophysical logs and tests reviewed by an independent reviewer?
Response: The logs and tests were reviewed by Dr. David Westjohn of USGS, under a grant from EPA, as well as by EPA staff.

10. **Comment:** The Compensated Z-Densilog, Compensated Neutron Log, Gamma Ray Log was submitted as complete but only reached 706 feet, not to the final depth of 4,600 feet. The test needs to be reconducted and the results submitted for review.

Response: The well was drilled in stages with casing set at the end of each stage. Before the casings were set, logs were run because many logging tools cannot make measurements through the steel casing and cement sheath. The log this comment refers to was made on October 19, 2001. On October 23, 2001, the section between 597 and 1,443 feet was logged, and on November 6, 2001, the section between 1,436 and 4,547 feet was logged. The entire well bore was logged. The results were reviewed and can be found in the Administrative Record.

11. **Comment:** The active SPMT natural gas wells have been erroneously labeled as 'Other' on every map provided in the petition. These maps need to be corrected and resubmitted.

Response: EPA disagrees. Under 40 CFR §§ 148.20(a)(2) and 146.64, the construction of wells which do not penetrate the injection or confining zone need not be identified. This is because such wells would not be

impacted by injection. The SPMT gas storage wells are drilled to depths less than 1,750 feet, which is over 600 feet above the top of the confining zone.

12. Comment: A map created by Subsurface for EDS was provided as evidence at the meeting held on January 8, 2003. As a piece of evidence and as a proper scientific exhibit it is rejected. The map is titled Figure 2 and recorded as having been drawn by PWJ. There is no note of what software was used to create this document. It has also not been checked, as noted on the document itself. Though a "job" has been assigned to it, it has no official number and therefore for all intents and purposes represents nothing. Figure 1, drawn by WDL was neither checked nor approved.

Response: The maps prepared by Subsurface Technologies and included in the petition submitted by EDS were reviewed in detail by EPA technical personnel. EPA confirmed that the mathematical results of the simulation have been compared to the depiction of the plume. The figure, by whatever means it was produced, does show lateral limits beyond which EPA is reasonably certain that the wastes which EDS proposes to inject will not reach within a period of 10,000 years.

The map presented by EPA for the January 8, 2003, public hearing was informational and not provided as evidence. The public hearings were held to provide the public an opportunity for public comment, and were not intended for EPA to provide evidence of the detailed review process conducted by EPA prior to proposing a decision.

Under Section 5 of the Administrative Procedure Act, 5 U.S.C. 554, trial-type hearings (evidentiary hearings) with cross-examination are only required in connection with matters which must, by statute, be determined on the record after opportunity for an agency hearing. See Buttrey v. United States, 690 F.2d 1179 (5th Cir. 1982). The Resource Conservation and Recovery Act contains no such requirement for no migration petitions.

13. Comment: EPA must rely on data obtained from the Citrin Road site. EDS must not be allowed to use old data to provide scientific data from a capped well at the Wahrman Road site for a land ban exemption. All the tests vital in determining whether waste will remain in the injection zone for 10,000 years should be collected from the Citrin Road site.

Response: EPA used data from the Wahrman Road site and other wells in the area as well as from the Citrin Drive site because EPA's technical review showed that the geophysical logs and cores from both the Citrin Drive and Wahrman Road sites as well other area wells displayed consistent subsurface geological characteristics over a large area. Laterally continuous formations are desired for use as an injection interval to allow

for the dissipation of pressure buildup resulting from injection activities. Geological data from the 1993 EDS well at the Wahrman Road site and both EDS wells at the Citrin Drive site were included in the petition and utilized in the no migration petition modeling demonstrations. The data from the Wahrman Road site is particularly useful because the well was logged with modern logging tools similar to those used to log the wells on Citrin Drive and because cores of the injection and confining zones were collected there. The interpretation of reservoir characteristics also took into account all available information, including logs, cores, and reservoir tests to provide the best assessment of the confining layers and injection reservoirs. The only data which must be collected only from the wells for which the exemption is given are data required under 40 CFR §148.20(a)(2)(iv) which demonstrate that the construction of those wells is sound. It is conceivable, but very unlikely, that all data regarding the geology might come from nearby wells. This is even less likely for wells drilled since 1988 because the regulations at 40 CFR § 146.66 require specific tests which can yield much of the necessary information be made at each Class I well to be used to inject hazardous waste.

14. Comment: The study of structural features made before the drilling of the well on Wahrman road is not valid for the Citrin Road site. If nothing else, the SPMT wells compromise the integrity of the injection zone.

Response: The study covered an area of many square miles. It included the area around the Citrin Road facility as well as the Wahrman Road area. It was updated following the drilling of the well on Wahrman Road to incorporate new information gained through drilling that well. The existing SPMT wells have no impact on the demonstration because of their shallow depths. The injection zone is more than 1,500 feet below the depth of the existing SPMT wells. If the proposed SPMT injection and extraction wells are constructed, they will be constructed to prevent upward flow. Therefore, the SPMT wells do not threaten the integrity of the confining zone or the injection zone.

15. Comment: Normal geological studies of the interior of the earth have not been performed by EDS. It would have been a simple matter of using explosives or even a pounder to get the images needed. EDS did not do this and has constructed a fairly imaginary view of the underground at this point. The result is that false information is being relied upon to support fanciful interpretations of nonexistent data based on supposition and opinion.

Response: The test suggested by the comment would not provide precise results in the area. Studies such as the commentor describes require the placement of sensing arrays through the areas which are to be investigated and many repetitions of the exercise along roads in the area. The results will show

only the relative distance of strata which reflect seismic energy back to the sensors. This allows the production of fairly detailed structure maps on a few horizons. The process works well where there are alternating, thick layers with widely differing acoustic properties. This is not the case in the area around EDS. The thick carbonate section overlying the injection interval has few shales which are thick enough to produce good reflections. The interpretation of reflection seismic data still requires well bores to allow calibration so that physical depths rather than time horizons can be mapped. The seismic method provides only structural information. It cannot tell much about the ability of the sedimentary layers to either hold and transmit liquids or to prevent their escape. The critical physical properties of the reservoir and confining strata have been evaluated using downhole methods or laboratory methods using material from the actual injection and confining strata which provide direct measurements. EPA was able to characterize the subsurface conditions using the information reviewed. Neither the federal nor Michigan regulations governing underground injection require that reflection seismic studies be made.

16. Comment: The core sample displayed by EPA at the public meeting on January 8, 2003, was dry and decompressed. It is not a reasonable example to prove that the injection zone is safe or appropriate for the purpose intended.

Response: The core samples displayed at the meeting were not from the EDS Citrin Road wells. One was from the Wahrman Road well, and the other was from a Class I injection well operated by ISG in northwestern Indiana. The cores from the Citrin Drive well are in storage at Core Laboratories' facility in Houston so that they will be available for any future testing. The cores were displayed to provide examples of the differences between injection zone and confining zone formations. All cores dry upon exposure to the atmosphere, and the slight decompression which occurs does not alter the gross physical properties of the core. The cores from the injection and confining zones from the Citrin Drive wells and other wells in the region were analyzed using industry standard methods, and they do show a porous, permeable reservoir overlain by formations with permeabilities less than one one-thousandth of that of the injection zone. In addition to the cores, the logs, injection tests, and other data confirm the suitability of the formations for injection.

17. Comment: Well bore 12-1 clearly shows radical permeability modulations between the depths of 4,580 and 4,600 feet. Layers above the injection zone show pockets of lower pressure and higher permeability. Because of the matrix of cracks which is nearly continuous between the layers, the materials that are lighter than water will immediately begin evacuating towards the surface with the result that water and heavier fluids will move to replace them. This will create an unwanted, unstudied and misunderstood flow of

materials. Injection of buffers between batches of waste will exacerbate the problem and quicken the destruction of the matrix.

Response: Well logs do not provide any means to determine either pressure or permeability, so the assertion that the logs show such pockets is inaccurate. The well records have been reviewed by qualified analysts who have identified no features such as a "matrix of cracks" between the layers. In fact, the experts state that the few fractures which were identified have been sealed with mineral deposits where penetrated by the wells. Fluid movement due to density contrasts has been considered in the demonstrations, but only in the context of the geology as documented by studies of the cores and logs; that is, without an assumed matrix of cracks. The only effect of the buffers which may be injected between some batches of waste will be to prevent reactions between chemicals in the separated batches from occurring near the well bores and cause marginal increases in spreading of the waste plume as a result of their volume.

VIII. Geological Concerns

1. Comment: The geological media will eventually become saturated leading to effects not yet considered.

Response: EPA disagrees. The term "saturation" refers to the fact that all pores are fluid filled. The reservoir rock in the injection zone is water saturated. The modeling took this fact into account.

2. Comment: With EDS injecting on one side of Interstate 94, and SPMT pumping on the other side, the liquid flowing beneath the road will undermine the limestone rock. The Department of Mines and the Army Corps of Engineers should be approached before allowing these wells to operate on opposite sides of an interstate freeway.

Response: The injection zone is made up of physically deposited sedimentary rocks, and contains very little limestone. The particles of which these rocks are formed are the weathering products from igneous rock and are very resistant to further chemical attack. They will not be degraded by the action of acids or other corrosive wastes and will maintain their mechanical strength even if SPMT were to extract brine from the Mt. Simon Sandstone at its facility. If SPMT extracts brine from the Lockport, that formation is separated from the injection interval by over 1,700 feet of sedimentary strata which generally have low permeabilities, particularly in the vertical direction. As a result, pumping for extraction by SPMT from the Lockport will have no effect on the movement of waste injected by EDS.

3. Comment: Wastes containing hydrochloric acid will hasten solution of limestone.

Response: The injection zone is made up of quartz sandstone with some shale, which are effectively attacked by only hydrofluoric acid, and some dolomite which is subject to solution by stronger acids. Minor amounts of dolomite are found mostly disseminated throughout the sandstone and shale so that even if some is removed, the rock will maintain its integrity. The make up of the formations of the injection zone is similar to that at the Vickery and northwestern Indiana sites where very acidic wastes are injected. The well bores at these locations retain their diameters despite over 30 years of injection at some sites.

4. Comment: A weak hydrochloric acid will cause all varieties of calcite to fizz, giving off hydrogen gas. This gas will be created by reaction with calcite crystals in the injection zone and it will be either forced upward through the 'projected' confining zone into rock with higher concentrations of calcite or it will be forced downward and will then float the clay layer under high pressure until the structure of the underlying landmass is disturbed. Faults, fractures, micro-fractures, and such will be moved and provide a more direct path for the liquid bound by natural forces to expel itself from the high pressure area.

Response: The small amounts of carbonate material which are dissolved may increase the capacity of the sandstone to contain and transmit the waste by some small amount by their removal. The carbon dioxide (not hydrogen) produced will be of minute amounts and will remain in solution creating additional weak acid. However, because the injection zone is a sandstone and not clay, the course of least resistance is parallel to rock layers within the sandstone. Therefore, the waste will remain in the sandstone. The injection pressure will be limited to 917 pounds per square inch (psi) at the surface so that pressures greater than 0.713 psi per foot of depth in the injection zone are not exceeded. Because of the weight of the overlying rock, a pressure of about 1.1 psi per foot of depth is required to lift the overburden. The pressure limitation will assure that no vertical or horizontal parting of the injection zone will occur.

5. Comment: The material will be constricted and filtering and parting will occur.

Response: EPA disagrees. The permits and the exemption include limits on the injection pressure to assure that parting does not occur. In addition, to prevent just such problems which would curtail EDS's ability to inject, the waste will be filtered at the surface to remove undissolved constituents. The remaining dissolved constituents will travel freely unless reactions which cause the formation of solid particles occur. If this happens, the products of the reactions may reduce the size of pore throats thereby reducing permeability and adding to the pressure required for injection.

The effect of this is to reduce the rate at which injection can occur because the injection pressure is limited by the exemption and permit.

6. Comment: Gases will collect that do not normally exist in that area. They will seek an escape and do so. An example of this behavior was provided in one instance by the release of nitrous oxide from a failing well in Ohio – a well used as an example for this well.

Response: EPA disagrees. The release of gas at the Vickery Environmental, Incorporated facility in Ohio occurred during mixing before the material was injected. Releases should not occur at the EDS facility because all unloading will be done within a containment building which is designed to prevent the release of such gases. Surface storage facility issues concerning the storage of hazardous waste prior to injection are regulated under Michigan analogs to 40 CFR Part 264, and are not considered under 40 CFR Part 148. The area of concern of the no migration regulations in 40 CFR Part 148 starts at the wellhead and does not include surface facility storage or pipeline issues. Accordingly, surface waste storage facility issues were not considered as part of the no migration petition decision.

7. Comment: EPA can't tell us what the acid is going to do, that gases won't build up and get out.

Response: The no migration demonstration provided by EDS addressed the issue of waste compatibility with the injection zone as well as the containment of such wastes within the injection zone as required in 40 CFR §§ 148.20, 148.21 and 148.22(a). In accordance with 40 CFR § 146.70(b)(6), EDS addressed compatibility issues in the application for the Class I UIC hazardous waste injection permits that were reviewed by EPA. Reaction of acids with carbonate rocks such as limestone and dolomite results in the creation of carbon dioxide which is a gas at atmospheric pressure. At the pressure in the injection zone, carbon dioxide is not a gas. Carbon dioxide may exist as a supercritical liquid which has some gas-like properties, such as compressibility. It is also much more soluble in water. As a result, any carbon dioxide which is generated is likely to be carried away from the wells with the liquid waste constituents. For almost 50 years SPMT has operated gas storage caverns at depths less than one half that at which EDS plans to inject wastes. Thus far, no gas is reported to have escaped as a result of unknown conduits.

8. Comment: Injection of this exotic blend of chemicals will give rise to what is known in petroleum engineering as immiscible displacement with adverse mobility ratio.

Response: Immiscible displacement is a condition that occurs when injected liquid will not mix with the pore fluid because the injected liquid is an organic liquid or is a polymer which resists mixing with the pore fluid. Under EDS's petition, the injectate will be in a water solution which is miscible with the formation brine.

9. Comment: The closure pressure and injection rate are such that injection will not occur in a slow and continued stream. Instead, the well will require large increases in pressure over long periods of time or in short bursts to force the injectate away from the injection well.

Response: Injection testing with fresh water already performed in the EDS wells has shown that this is not the case. A step rate test in which the injection rate was increased in steps was performed in December 2001. While injecting at low rates, a regular exponential increase in injection pressure was measured. This is the response which is normal when injecting into a layered reservoir through an injection well. Each time the injection rate was increased, the injection pressure again increased as expected. When fracturing pressure was exceeded, the pattern of pressure increase changed. As a result of analyzing this and other tests making use of injection, EDS was able to address issues arising from the interaction of permeability, injection rate, and closure pressure in terms of the containment of wastes within the injection zone as required in 40 CFR §§ 148.20, 148.21 and 148.22(a). Closure pressure is addressed by limiting injection pressure to prevent opening of fractures. By ensuring that fractures are not opened, all injection can be treated as occurring within the permeable layers of the injection interval.

10. Comment: The viscosity of the injected wastes will be different from water viscosity by great factors. This, coupled with heterogeneity in the injection zone, will lead to fingering type flow where the injected flow will displace the existing pore fluid not as a coherent front, but in numerous fingers.

Response: The viscosities of wastes will not be greatly different from that of the pore fluids, less than a factor of two. Fingering will occur as a result of heterogeneity in the injection zone as well as the viscosity difference. This gives rise to dispersion (fingering flow) which is accounted for in the modeling. Simulations used a conservative assumption of dispersivity. If dispersivity were not taken into account, the waste plume would seem to expand around the well in a very regular cylinder within which the liquid in the formation would be 100% waste and outside of which the liquid would be 100% formation water. Under the modeled injection scenario excepting injection by SPMT, the radius of the waste plume would be just 3,200 feet after 20 years. As a result of including a dispersivity of 300 feet, the plume radius is increased to more than 13,000 feet at the distance where the concentration of waste in the formation water would be less than

one in one trillion. By using conservative assumptions such as this, the demonstration defines limits beyond which waste constituents, in hazardous concentrations, will not migrate.

11. Comment: The temperature in the injection zone may be much different than that at the surface. When a temperature log was run in January of 2002, the surface temperature was between 38 and 39° F and the temperature at 4,800 feet was between 93.4 and 95° F. Liquids behave differently at such different temperatures and no account of this has been taken.

Response: The primary change in behavior is a decrease in viscosity at higher temperatures. Because the temperature increases with increasing depth, the viscosity of the injectate will decrease causing the pressure required for injection to decrease. Because water has a high specific heat and low conductivity, the injectate will tend to maintain its own temperature as it travels down the well and it will bring the invaded region of the injection interval to its own temperature through time. The viscosity of fresh water at 40° F is about 1.5 centipoise (cp). This decreases to about 0.72 cp at 95° F. The viscosity of a brine containing 10% sodium chloride will decrease from about 1.72 cp. to 0.85 cp (Bradley, 1987) over the same temperature range. In either liquid, the viscosity decreases by about 50%. Therefore, this 50° F variation in injection temperatures means a 50% difference in the resistance to flow in the areas in which the temperature difference exists. Pressure in the injection zone decreases as the distance from the well bore increases. Because most of the pressure drop is very near the well, temperature variations can cause significant variations in injection pressure. The effects at the critical area, which is the limit of the area of review, are dominated by the viscosity of the water native to the injection interval because the waste will not reach that area during the active life of the wells. Therefore, viscosity changes with regard to temperature change will not materially affect the results of modeling. Further, 50% variations in viscosity are unlikely because the waste will be handled indoors and will rarely be injected at temperature extremes.

12. Comment: One commentor asserted that a study of light non-aqueous petroleum liquids (NAPL) in an unsaturated zone indicates that effects would not appear for 15 to 35 years, after EDS has closed the facility.

Response: The results of such a study are not applicable because the injection zone is not an unsaturated medium. Migration in an unsaturated zone includes vaporization and subsequent vapor transport, and this is not the case in a saturated zone such as the deep injection zone at the EDS site. It is also unlikely that any non-aqueous liquids will be injected in concentrations that would allow formation of a separate phase. Most importantly, although the commentor did not describe the effects he predicted, the

injection zone at the EDS facility is overlain by confining layers with very low permeability which will ensure that the waste will be contained.

13. Comment: Experimental and modeling studies have shown that, in unsaturated, porous media, vapor diffusion is enhanced relative to the diffusion of noncondensible gases by pore-level phase change effects.

Response: The injection zone for the EDS wells is a saturated medium, and results of these studies cannot be related to diffusion of molecules in saturated media because there is no vapor transport in water saturated media. The petition demonstrated that cesium is the most mobile ion, and therefore would diffuse farther than any other within a saturated medium. The diffusion rate of cesium was used to maximize the predicted distance which waste constituents might migrate upward as a result of diffusion.

14. Comment: The interval between 4,550 and 4,650 feet is recorded as "quartz." Mica and gypsum are recorded as well as "other minerals." The other minerals are not described elsewhere and a false assumption has been made that there is, in fact, a matrix into which this material will be injected, that will hold it, and will not allow it to migrate out of the zone into which it has been injected.

Response: The amounts of other minerals are very small relative to the amount of quartz. The presence of small amounts of other minerals in the injection zone does not affect EPA's assumption. Reservoir strata overlain by confining strata exist as has been demonstrated through a variety of test methods, and the confinement of the waste within the zone will be demonstrated regularly throughout the lives of the wells through the use of geophysical logging and reservoir tests.

15. Comment: The clay layer into which the waste will be injected is an ideal medium for purification.

Response: The layer into which the waste will be injected is predominantly quartz sandstone with some shale, a rock formed from clay, and other minerals. The Mt. Simon sandstone does include clays which trap contaminants on their surfaces. The resulting decrease of concentration in the plume was disregarded in order to achieve a conservative assumption that maximized the potential spread of the waste plume.

16. Comment: The clay layer is almost impermeable. Whatever is injected into it will be forced through it.

Response: The sandstone layer into which the waste will be injected is not impermeable. The waste will flow through it under pressure.

17. Comment: Because the clay is almost impermeable, this layer will become saturated with chemical residues. Some of them will react with each other and do so with violence.

Response: The injection zone is not clay and has adequate permeability to allow flow. The injected chemicals will not react with explosive violence. Injection of reactive wastes, as defined by 40 CFR § 261.23 (D003) is prohibited by the Michigan Department of Environmental Quality (MDEQ) permits and the exemption. When the federal UIC permits are re-issued, they too will prohibit the injection of reactive wastes. The make up of wastes proposed for disposal will be reviewed by EDS's chemists. Applications for approval of wastes which EDS believes are suitable for injection and which meet the permit criteria will be sent to MDEQ and EPA for approval before they are injected. If the wastes are approved, then each load will be checked to be sure that it is the material which was approved. A complete chemical analysis of each hazardous waste will be made quarterly to ensure that the make up of the waste does not change though time.

18. Comment: Because of the reactions, either the clay or the injected material will need to evacuate the area. Chemicals will follow the course of least resistance along "fault lines, fractures, cracks, and even levels of pressure."

Response: There will be no rapid volume-increasing reactions because of the prohibition against the injection of reactive wastes. The increased pressure does not pose an environmental risk because the pressure is limited by the permit to prevent the formation of fractures. As the pressure increases, the operator must reduce the injection rate to avoid violating the permit limitation.

Fluids under pressure do flow along the course of least resistance. In this case, that is laterally through the sandstone reservoir rock. As discussed in EPA's determination, there are no known transmissive faults, fractures, or cracks in this rock. The flow will go from the area of high pressure near the well horizontally toward the areas of normal hydrostatic pressure.

19. Comment: The substrate may be composed of something called salt "crush" which would hasten the movement of water from the Michigan Formation. The commentor did not know the meaning of the term "salt crush," and geologists he talked to were also unfamiliar with it.

Response: It is difficult to respond to concerns about materials which are undefined. EPA expects the flow caused by injection pressure to be stopped within a few tens of feet of rock immediately above the injection interval. These layers of rock immediately above the injection interval have been cored and studied in cuttings. They contain dense rock made up of well

cemented sand, silt, shale, and dolomite. These materials do not hasten the movement of water. The make up of rock much above this will have no effect on the extent of fluid migration. The Michigan Formation is not present in the area of the EDS facility because it has been removed by erosion.

20. Comment: Injection of water into limestone and salt "crush" without an outlet could cause inflation of the pore system which could cause fracturing and exaggerated motion of the liquid and overlying rock to the surface if there is even a small earth tremor.

Response: The wastes will be injected into well-consolidated sandstones which will maintain their integrity despite the injection because both the sand matrix and the cement are made up of quartz which is strong and resistant to chemical attack. Risks arising from seismic events are discussed below.

21. Comment: The underground structures created by waste injection will not be repositories for waste *ad infinitum*, but they will be permanent.

Response: EPA does not know what the commentor means by "underground structures created by injection." The proposed injection will not alter existing geological structures.

22. Comment: The injection zone in the Mt. Simon and SPMT's caverns are separated by limestone. Liquids injected by EDS at high pressure will migrate toward the region of extremely low pressure at the SPMT facility. This will cause a degradation of the rock which will acidify the water and cause solution and collapse of the overlying rock.

Response: There are approximately 1,500 feet of limestone and other rocks overlying the injection zone and underlying the salt formations in which the SPMT caverns have been developed. Most of these rocks have extremely low permeabilities. As the no migration demonstration shows, there will be no upward flow beyond about ten feet above the top of the injection interval. Because there will be no flow through the rock above the injection zone, it will not be degraded.

23. Comment: The cement holding the sandstone together in form under pressure is of a type that several of the chemicals that have been approved for disposal at this site will dissolve in place. The solution and weakened structure created thereby will fold and the fissures and cracks that have already been recorded will widen.

Response: The Mt. Simon cement is mostly quartz, the same, generally non-reactive, mineral which makes up the grains. The only acid which actively attacks quartz is hydrofluoric acid. Based on the history of injection elsewhere, it

is the Agency's technical judgement that the amounts of hydrofluoric acid which might be injected are sufficient only to enlarge the pore system to allow injection with somewhat less pressure than might be otherwise required.

24. Comment: The Pre-Cambrian Wash layer occurring below the injection interval has not been considered of importance. It is most likely that the Pre-Cambrian Wash will quite quickly begin to spread the waste far beyond the containment area. The sampling will not find this immediate danger as the level of testing that EPA plans on will not take this level into account.

Response: The Precambrian granite wash strata are near the bottom of the injection zone. The radioactive tracer tests and temperature logs conducted in both EDS injection wells indicated the majority of waste exits the open hole in the Mt. Simon Sandstone well above the granite wash. The simulation of plume movement does not describe the location of the most permeable part of the injection interval. It is not precluded from being within the granite wash, although, based on experience, EPA does not expect that to be the case. Granite washes in the Mt. Simon tend to be made up of sediments which are poorly sorted and may possess low permeability. Test of other Class I wells in Region 5 show that the majority of injected liquid leaves the well within the top third of the Mt. Simon.

25. Comment: As the waste injected by EDS forces the naturally occurring salt brine out of the injection zone, it will intrude into the fresh water aquifers and contaminate well water.

Response: The characteristics of the formation brine are within the range of liquids for which the demonstration was made. Therefore, the brine displaced by the waste plume will be confined to the injection zone along with the waste. All movement will be approximately horizontal and, therefore, will not reach fresh water aquifers, which are over 3,000 feet above the top of the injection zone.

26. Comment: Earth's systems are not closed. The injection of liquids into underground formations which already contain liquids will cause the migration of formation fluids in directions which will depend on actual conduits and barriers to flow.

Response: Geological formations may or may not be closed. Some formations contain lenses of porous sandstone which may be closed. If the formation is extensive enough, these closed lenses may also be very extensive. When injection occurs, formation brine is displaced. However, because water is slightly compressible, the injection of a volume of water does not mean that an equal volume of water is displaced at the edge of the plume. Some of the energy is stored as an increase in pressure. This pressure

increase will cause formation brine to migrate even after the injection well is plugged. Movement will stop when the energy stored is no longer sufficient to force additional movement. Pressure driven movement will be increasingly slow after injection ceases, and will virtually cease within one hundred years. A small pressure increase will remain. The Mt. Simon reservoir is very large with the nearest surface exposures hundreds of miles away. The formation becomes much thicker between southeastern Michigan and the areas where outcrops occur. This further absorbs the pressure increase. As a result, there will be no measurable flow out of the reservoir. Because horizontal permeability is several orders of magnitude higher than vertical permeability, there will be no upward migration of waste out of the injection zone. The area of review search indicates that there are currently no conduits within the area of review in which pressurization will be sufficient to overcome the hydrostatic pressure within the lowermost USDW. Testing of the injection interval within several hundred feet of the wells indicated that flow will be essentially horizontal and directed away from the injection well bore. This relationship is assumed to be the same throughout the affected area of the reservoir. Descriptions of both the confining and injection zones' characteristics are listed in the Notice of Intent published in the Federal Register (67 Fed. Reg. 77981, December 20, 2002).

All wells within the calculated cone of endangering influence were demonstrated to be properly constructed or plugged to prevent the migration of waste from the injection interval. The petition includes a complete assessment of all wells within the injection wells' AOR as required in 40 CFR § 146.63 and 40 CFR § 148.20(a)(2)(i). Based on EPA's technical review, EDS met the requirements of 40 CFR Part 148 subpart C and demonstrated there would be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. EPA's review also determined that the standards in 40 CFR Part 146 were satisfied. EPA has determined that the EDS injection wells are protective of human health and the environment.

27. Comment: Water in the Ecorse River flows from southwest to northeast. It is likely that waters in the subsurface will be moving in the same directions, from the direction of the EDS wells toward the SPMT well.

Response: Fluids flow from areas of higher potential energy to areas of lower potential energy if there is a channel available. On the surface, potential energy is based on elevation. The Ecorse River flows toward Lake Erie. The level of the surface of Lake Erie defines what we call the base level, the lowest potential energy level in this area. The turns of the river are based on many geologic factors as well as on chance. At any point in time, the flow of water on the surface is constrained by the form of the land surface.

In the subsurface, flow is not constrained in the same way. Potential differences cannot always be so easily identified as they are on the surface (by elevation). Areas of high and low potential must be identified by pressure measurements as well as by relative depth differences. In blanket-like formations such as the Mt. Simon the flow occurs over the entire area of the formation, not in discrete river-like channels.

Several studies of ground water motion have been published. Neeraj Gupta[3] found that flow in the Michigan basin is from the center toward the margins and that the rate of flow is generally less than 0.2 feet per year. Other investigations (Clifford[4], 1972, Nealon[5], 1982) agree that the flow velocity is low, with Clifford's conclusion that flow velocity is no more than six inches per year being the highest estimate. Clifford disagreed with the direction of flow because he did not consider variations in formation brine density.

Please note that the Lockport formation is separated from the injection interval by over 1,700 feet of sedimentary strata which generally have low permeabilities, particularly in the vertical direction. As a result, pumping for extraction by SPMT from the Lockport will have no effect on the movement of waste injected by EDS.

28. Comment: The rate of ground water motion is not known scientifically. Any change would effect the SPMT wells and SPMT's ability to extract heating fuel.

Response: There is no relationship between the fuel stored in SPMT's caverns and the rate of ground water flow in the Mt. Simon Sandstone because there is almost 2,000 feet of vertical separation between the impermeable salt beds in which the caverns are developed and the reservoir rocks within the Eau Claire and Mt. Simon Formations.

29. Comment: In the event that ground water motion at the proposed level of dumping is 1 meter per year then in 1,000 years you would expect a molecule of water to have traveled 1,000 meters or a little less than 1 mile. If ground water motion is 50 meters per year, then in 1,000 years that molecule would have traveled 50 miles.

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[3]Gupta, Neeraj, 1993. Geologic and Fluid-Density Controls on the Hydrodynamics of the Mt. Simon Sandstone and Overlying Geologic Units in Ohio and Surrounding States: unpublished PhD dissertation, Ohio State University, Columbus, Ohio, 266 p.

[4]Clifford, M.J., 1975. Information circular No. 43: Subsurface Liquid Waste Injection in Ohio, Ohio Department of Natural Resources, Columbus, Ohio, 26 p.

[5]Nealon, D.J., 1982. A Hydrological Simulation of Hazardous Waste Injection in the Mt. Simon, Ohio: unpublished MS thesis, Ohio University, Athens, Ohio, 1982, 285 p.

Response: One thousand meters is equal to approximately 3,280 feet, less than two thirds of a mile. If the rate were 50 meters per year, then the distance traveled in 1,000 years would be 50,000 meters or slightly more than 31 miles. While the well is injecting, the velocity as the waste flows away from the well changes with the distance from the well because each foot of distance from the well adds more volume. At 10 feet, the flow rate would be about 70 feet per minute, but it would decrease to about 35 feet per minute at 20 feet. At 1,000 feet, the velocity would be 0.7 feet per day. The natural rate of flow was conservatively estimated to be 0.4 feet per year. At that rate, the fluid will move 4,000 feet in 10,000 years after injection ends.

30. Comment: The actual flow will be "forced, intrusive and frenetic."

Response: The flow rate decreases rapidly with increasing distance from an injection well because of the widening waste front at increasing distances. The proposed injection rates are similar to those used in many other similar wells where there have been no adverse effects related to the rates of flow.

31. Comment: The water table is too high to accept this risk.

Response: The injection zone is separated from the surface by a number of impermeable zones and therefore from the surficial aquifer where the water table is measured. The water table has no effect on the migration of wastes through formations separated from the surface aquifer by thousands of feet of intervening strata.

32. Comment: It would be sensible to locate the EDS facility above a depleted oil field so that the waste could be injected into a region which has been drained.

Response: Locating an injection facility within a depleted oil field does have the advantage that the pressure is depleted at the initiation of injection. However, oil fields usually have had many wells drilled in and around them. It may be difficult to be sure that all of these wells have been properly plugged. In addition, the Mt. Simon and Eau Claire Formations are much deeper than any oil fields in the area so there are more barriers to upward flow and the possibility of a poorly plugged exploratory well is reduced. In any case, EPA examines compliance with siting and other requirements, but does not select the location of wells.

33. Comment: The proposed injection zone is only 1,300 feet deeper than a mine operated in Keweenaw County in the last century.

Response: The geology of Michigan's Upper Peninsula, where Keweenaw County is located, is much different from the geology around Detroit and consists of

igneous and metamorphic rocks. Deep well injection would be inappropriate in the Upper Peninsula. Injection is only feasible where there is a broad expanse of thick sedimentary rock. Porous and permeable zones in igneous and metamorphic rocks result from fracturing or flow through lava tubes so that flow in either horizontal or vertical directions may be unpredictable. There is very little sedimentary rock cover in the Upper Peninsula of Michigan so that the only porous and permeable zones are shallow, unconfined aquifers which would probably contain drinkable water. In the Detroit area, there are no known mineral resources beneath the Salina Formation, from which salt is mined at depths less than 2,000 feet. Therefore, a mine in the area around EDS would not be affected by the injection of hazardous wastes.

34. Comment: The injection zone is relatively shallow considering that the waste will travel in all directions dissolving the rock as it goes.

Response: Because the waste is being injected into an aquifer which is nearly flat lying, it will move horizontally in all directions. It will not move upward or downward very much. As a result, the 3,500 feet of rock between the injection interval and the USDWs are more than adequate to prevent contamination of drinking water. It will not dissolve rock because the rock is not soluble in most acids. EDS has shown that the hydrological and geochemical conditions at the site and the physiochemical nature of the waste streams are such that reliable predictions can be made that injected fluids will not migrate within 10,000 years (A) vertically upward out of the injection zone or (B) laterally within the injection zone to a point of discharge or interface with a USDW.

35. Comment: The State regulation requiring separation of injection reservoirs from fresh water strata is violated by the existence of a permeable bleed-off zone above the injection formation.

Response: The fresh water strata are above the bleed-off zone, and the injection zone is below the bleed-off zone. Therefore, there is separation and the existence of a bleed-off zone does not violate such a requirement.

36. Comment: The exemption requirement for a bleed-off layer above the confining zone gives EDS the right to use the karst layer.

Response: The conditions under which the exemption is granted set specific depth and stratigraphic limits on the injection interval. These conditions are incorporated into EPA's permits and preclude use of the karst zone for injection. Further, this karst zone is the lowermost USDW and could not be used for the injection of hazardous wastes. The regulations at 40 CFR § 146.62(d)(1) require that there be a bleed-off zone above the confining

zone. Any zone which is cited as a bleed-off zone is excluded from injection.

37. Comment: EPA states in the Notice of Intent that EDS had to show that its wastes will be covered by a "bleed-off" layer. If the wastes do travel farther than expected, they will spread out in this porous rock that serves as a safety valve. There must also be a "containment" layer above the wastes. This is a rock with limited porosity that will prevent further movement of the wastes.

Response: The Preamble to the final Part 146 and Part 148 regulations published July 26, 1988, states: "The standards in § 148.20 were developed to assure that no injected waste could leave the injection zone. Part 146 is meant to assure that there will be no endangerment of USDWs, either from injected fluid or formation fluids. With respect to injected fluids, the standards in 148 are certainly more stringent since they prohibit migration of any injected waste at hazardous levels out of the injection zone. However, endangerment encompasses a broader set of concerns and therefore warrants a broader set of regulatory controls." (53 Fed. Reg. 28117, at 28133 - 28134) Thus, the regulations for the UIC Class I hazardous waste permit and no migration petition, both administered by EPA in the State of Michigan, apply complementary, but different, standards.

The bleed-off intervals referenced in the comment were discussed in the Site Description portion of the Notice of Intent and pertain to the geologic and siting requirements for the Class I hazardous waste injection wells. Specifically, 40 CFR § 146.62(d)(1) discusses the requirement of at least one sequence of permeable and less permeable strata located between the confining zone and the base of the USDW, whereas 40 CFR § 148.20(b) requires a confining zone to be defined above the injection zone. As discussed in the preamble to the 40 CFR Part 148 regulations, the purpose of the confining zone is to oppose the upward pressures of injection and prevent fracturing of the geologic system (See generally 53 Fed. Reg. 28117, at 28127 and 28133, July 26, 1988). However, to satisfy the no migration requirements of 40 CFR Part 148, no injected waste can migrate from the injection zone. Therefore, the injection zone must include some containment strata above the injection interval. The discussion of these formations was included in the Injection Zone Description section of the Notice of Intent published in the Federal Register (67 Fed. Reg. 77981, December 20, 2002).

In addition to the Mt. Simon Sandstone, the EDS injection zone contains the Trempealeau, Glenwood, and Black River formations located between 3,369 and 3,937 feet below ground level (BGL), which will prevent the migration of wastes upward, out of the injection zone. A confining zone was also assigned as required under 40 CFR § 148.20(b) and consists of

the Utica Shale and the Trenton and Black River Formations located between 2,364 and 3,369 feet BGL. EPA reviewed in detail the no migration petition and concluded EDS has shown, among other things, that reliable predictions can be made that the injected fluids will not migrate within 10,000 years vertically upward out of the injection zone. Under this standard, the waste will not enter the confining zone or reach the "bleed-off" layer located above the confining zone.

38. Comment: Information ("In some areas of northern and southeastern Michigan karst and collapsed or fractured strata may result in losing returns into deep aquifers containing fresh water. These geological conditions are associated with the subcrop and outcrop of the Devonian and upper Silurian strata") contained in the Michigan Rules for the construction of oil and gas wells contradicts the claim that the formation into which EDS plans to inject waste is similar to that into which wastes are injected in Ohio and Texas.

Response: The wells are constructed for injection of wastes into Cambrian age strata which lie thousands of feet beneath the subcrops of the Devonian age strata in this area. The nature of these younger strata is unrelated to the lithologic makeup of the formations of the injection zone. The similarity of the formations in Ohio and Texas referred to the fact that they are made up primarily of silicates, such as quartz sandstones, and shales, which are generally non-reactive.

39. Comment: An area with caverns is inappropriate for waste injection.

Response: The caverns which SPMT uses were created by SPMT and are over 1,500 feet shallower than the injection zone. There appear also to be caverns at the bedrock surface, buried only by the glacial till. Areas with caverns are only inappropriate when the caverns are part of the fresh water aquifer system and injected liquid can find its way into the caverns. That is not the case beneath Romulus.

40. Comment: According to EPA the underlying rock is limestone.

Response: Most of the rock above the injection zone is either limestone or dolomite. The injection interval, however, is principally made up of sandstone, shale, and siltstone.

41. Comment: The waste will be injected into a reservoir that lies beneath porous rock. EDS has stated that the waste will probably travel sideways. This statement leaves open the possibility that hazardous materials will travel almost anywhere, including the drinking water supply or to the Great Lakes. Leakage of even a small amount of waste could place our entire ecosystem at great risk.

Response: Waste will be injected into porous rock which is overlain by many hundreds of feet of rock with very low porosity. The waste will travel horizontally within a fixed group of strata which are always far below any water which might serve as a drinking water supply in southeast Michigan.

In the preamble to the final rule for hazardous waste disposal injection restrictions and requirements for Class 1 wells (July 26, 1988), EPA emphasized that conservative modeling can be used to bound the problem, therein forming the basis for a no migration demonstration. By bounding, the modeler essentially predicts what will not occur through the use of conservative data and assumptions. The no migration demonstration addressed containment of both vertical and horizontal waste movement as delineated in 40 CFR § 148.20(a)(1)(i). The maximum vertical movement of the waste at the end of 10,000 years was conservatively estimated at 239 feet above the top of the injection interval located at 3,937 feet. The waste will remain 3,298 feet below the lowermost USDW at depths of less than 400 feet. The maximum predicted lateral waste plume movement within the injection interval was approximately 10 miles in the updip or south-southeasterly direction. The maximum predicted lateral waste plume movement in the downdip or northwesterly direction was 6.85 miles from the injection wells. Based on these demonstrations, EDS demonstrated that, to a reasonable degree of certainty, wastes will not migrate from the injection zone for at least 10,000 years. This included a showing that reliable predictions can be made that the injected fluids will not migrate within 10,000 years vertically upward out of the injection zone, or laterally within the injection zone to a point of discharge or interface with a USDW. Based on the no migration petition review, EPA determined that neither the Great Lakes nor the drinking water supply are in danger of contamination from the proposed injection wells because they are 3,298 feet above the maximum depth to which the waste will rise.

42. Comment: Reliable containment of many of these chemicals will require multiple barriers which do not exist at this location.

Response: EPA disagrees. The commentor is incorrect in his assertion that multiple barriers do not exist. Multiple barriers do exist between the injection zone and USDWs. Each series of less permeable and more permeable sedimentary layers can be considered to be a barrier. Pressure is required to force the injected wastes through each layer with low permeability, while each layer with higher permeability allows the pressure needed to overcome the next barrier to be dissipated by lateral flow. As a result, there are many hundreds of barriers, some more and some less difficult to overcome, and as a result vertical movement is strongly opposed by natural obstacles. In addition, the best evidence (Gupta, 1992) indicates that any natural flow between formations in the deeper rocks in this area

would be very weakly downward. This would also oppose the escape of injected wastes.

43. Comment: During visual examination of the photographic images of the interior of the well bores, I noted at several locations deformities in the well bore wall that appeared to be compression related. I saw deformities that are cracks, veins and fissures at several locations. This pipe is not to be trusted.

Response: The well bore images are not photographic. The logging tool uses sound (sonar) to map the well bore wall. They show the condition of the well bore before casing is installed. Note that any fractures above the casing shoe are not significant because the steel and cement confines the waste until it reaches the injection zone. There are no fractures seen within the confining zone.

44. Comment: At 980 feet well bore #2-12 drew up some material listed only as "soft gummy." The production of this material at this level clearly shows the deposition characteristic of this area. It clearly shows a structure which is irregular in composition and which contains not only unknown structures, but unknown materials.

Response: Often shale hydrates when it is drilled. The clay structure expands and becomes soft and gummy. The notation is simply incomplete and does not indicate a problem.

45. Comment: The SPMT caverns have structurally weakened and deformed the local geological area. The caverns are now points of low pressure and wastes injected at high pressure will naturally seek areas of low pressure.

Response: Caverns can have severe impacts on overlying strata, including collapse. The underlying strata which separate the SPMT caverns from the interval which EDS proposes to use for injection are much thicker than the strata separating the caverns from the surface. They are not affected in the same way because the release of pressure caused by the removal of overlying material is much less than the effect of removing the underpinning from beneath a body of rock. The SPMT caverns are relatively small, so the chance of collapse is limited, and the permeability of the 1,900 feet of material between the caverns and injection interval and the half mile of lateral separation ensures that there will be no fluid movement toward the caverns despite the pressure differential.

46. Comment: The strata separating the caverns from the injection zone are spread through with cracks, fissures, microfissures, weak points, unstable high pressure points created as a result of the construction of surface structures and large subterranean explosions at the SPMT facility. Although safe as

presently used, additional stress from this new and unnatural waste stream could cause severe damage and destruction leading to contamination of the local drinking water and disruption of local business and normal traffic flow. In addition, vibrations in the vicinity might impact the wells.

Response: The available evidence indicates that mostly impermeable formations separate the formations in which caverns have been created and those formations into which EDS proposes to inject waste. Fractures are rare and filled with secondary minerals and therefore not transmissive. There are layers of rock which deform under pressure to close conduits between the injection zone and the salt formations in which the caverns are located. The activities at the surface, even the large explosions which the commentor reports, do not affect the strength of rocks at great depths. Geological materials are quite tough. The "rock" at the SPMT facility is soil. The shallowest rock is over 100 feet below the surface. Because soil is not rigid, it attenuates explosive forces more effectively than consolidated rock. You may have noticed traces of holes bored for the construction of road cuts. These holes were filled with explosives which broke up the rock, which was then removed to allow construction of the road. The sides of the shot holes along the wall of the road cuts are still largely intact despite having been only inches from explosions of considerable force. Similarly, mine shafts and the faces on Mt. Rushmore were blasted out of rock without damage to rock only inches from the explosions. Because of the attenuating effects of soil and rock, explosions affect only very shallow geological materials. There is no possibility that a past explosion might have caused a fracture which might reach 3,900 feet to the top of the injection zone.

47. Comment: Just because there are no known transmissive faults or fractures does not mean that they don't exist. What assurances do people have that somewhere "down there" is not a crack, hole, or some form of a defect that will allow injected waste to seep from its tomb? This may occur several miles from the point of origin or take years or even decades before detected.

Response: EPA disagrees. EPA reviewed EDS's protocol for locating artificial penetrations and determined that the petitioner conducted a complete search for artificial penetrations within the 6.1 mile AOR and the modeled 10,000 year waste plume. The search involved a thorough review of geological maps and drilling and plugging records. There is no evidence that transmissive faults or fractures exist and no such features have been suspected by geologists based on known information. Not only did the petitioner conduct tests to look for fractures during well construction, fractures are the subject of exploration for oil. No significant fractures have been identified in this area. EDS demonstrated, under worst case conditions, that the vertical movement of waste through an artificial

penetration would not proceed out of the injection zone. Area seismic activity and injection interval fracturing were also considered in the no migration petition and in EPA's technical review process. If there is a fracture, it must penetrate and be open through about 3,700 feet of various types of rock. The geologic column in the Romulus area contains a number of layers of salt and anhydrite. These rock types will flow under high pressure and so uncased well bores or fractures will be squeezed closed over time.

A standard is included in the regulations at 40 CFR § 148.20(b) which states that "A demonstration under §148.20(a)(1)(i) shall identify the strata within the injection zone which will confine fluid movement above the injection interval and include a showing that this strata is (sic) free of known transmissive faults of (sic) fractures and that there is a confining zone above the injection zone." EDS's demonstration met this requirement.

48. Comment: EDS states that fractures found were filled by minerals. EDS does not identify the minerals, but they are most likely calcite which will react with weak acids and cease to plug the fractures.

Response: It is very likely that the crystals are calcite. They plug fractures in rocks which are also composed of calcite or dolomite, another carbonate mineral which reacts with acids, but much more slowly. Often, because the in-filling crystals are larger, have less total surface area and have a more perfect crystalline structure, they are more resistant to acid attack than the surrounding rock. More importantly, very few fractures were identified and those identified were isolated so that it appears that there are no extensive, through-cutting fractures or interconnecting systems which might be transmissive.

49. Comment: Any discontinuity in the containment layer may allow some loss of waste from the reservoir. The area of the plume is so huge that discontinuities must exist within the plume area. Any discontinuities which allow flow may become enlarged so that an initial small leak could result in a catastrophic, eruptive failure and major discharge from the reservoir, and damage at the surface.

Response: There is no evidence of such discontinuities, though some may exist. There are over 3,000 feet of rock which was deposited in hundreds of layers over hundreds of millions of years. As a result discontinuities formed during deposition affect only a few layers. Flow through this sort of discontinuity would not proceed very far. Discontinuities might also be fractures or faults formed due to structural deformation. This type of discontinuity could have serious consequences if such features exist and if they are transmissive. Several lines of evidence suggest that such

discontinuities do not exist. There is no vertical pressure equilibrium between the various formations underlying the area. If there were conduits for flow, it seems probable that through the thousands of years the Michigan Basin has been in its current elevation, flow through any existing conduits would have resulted in pressure equilibrium. The SPMT caverns have not leaked nor was there any leakage reported through the years during which SPMT disposed of water in the Sylvania sandstone, just 400 feet below the ground surface in this same area. The success of deep well injection in many different areas also suggests that these possibilities are not very probable. EPA requires a search for fractures by means of a log which can identify them in the well bores of all hazardous waste disposal wells. EDS used a log which produces an image of the well bore by means of sonic reflection. Fractures cutting the well bore were identified at 1,451-56 (questionable), 3,355-3,356, 3,923-3,926, 3,929-3,933, 3,932-3,937, 4,570-4,573, 4,583-4,587, 4,610-4,613, 4,605-4,608, and 4,615-4,620 feet below the surface in Well 1-12, and at 2,336-2,338 and 2,720-2,723 feet in Well #2-12. These fractures were filled with reflective material indicating that they were sealed and not transmissive. Moreover, there is no claim of a known transmissive fault or fracture within the AOR.

50. Comment: The State geologist said that because oil and gas have not migrated in millions of years, the injected hazardous chemicals can be expected to be contained in the deep formation. However, oil and gas may migrate vertically along fracture and fault zones in less than two decades.

Response: As discussed in the Notice of Intent published in the Federal Register (67 Fed. Reg. 77981, December 20, 2002), there are no known transmissive fractures or faults in the injection zone. Additionally, a thick confining zone overlies the injection zone, providing an additional layer of protection. Because oil and gas can migrate along fractures and fault zones in less than two decades, the presence of oil and gas would indicate a good potential for containment. Although there are no significant oil or gas deposits in this area, there are oil and gas nearby in shallower zones. The fact that liquid petroleum gas (LPG) has been safely stored in the shallower Salina for over 50 years also supports the belief that there are no unknown conduits which might connect the injection zone to either the surface or USDWs.

51. Comment: No geohazard survey including a 3-D seismic survey was performed to identify potential conduits from the injection zone.

Response: EPA does not consider a 3-D seismic survey necessary to identify potential conduits from the injection zone. Fractures with limited vertical displacement can generally not be recognized by 3-D seismic surveys (Seeber et al, 1993). The search of the area of review is a geohazards

survey. The federal UIC regulations do not require 3-D seismic surveys, and they are rarely carried out around injection wells. Ohio regulations do require seismic surveys at Class I facilities. Surveys were carried out at five facilities in Ohio. These surveys did not identify conduits at Aristech where waste was discovered in a thin sand zone 1,000 feet above the injection zone (but more than 4,000 feet below any USDW), although core analysis indicated the probability for movement hundreds of feet above the injection zone there. As stated in the Notice of Intent published in the Federal Register: "Fracture logging of the three wells drilled by EDS indicated several sub-vertical fractures in the containment interval. These fractures have limited height and appear to be filled by mineral deposits, and do not compromise the integrity of the arresting interval. Because there are no known transmissive fractures and faults in the arresting interval, it is suitable for long term waste retention." (67 Fed. Reg. 77981, at 77987, December 20, 2002) Additionally, EPA's technical review of the no migration petition included an evaluation of area seismic activity, core data, and geophysical well logs; the AOR and projected plume area; well completion conditions; and subsurface geologic maps. Based on EPA's technical review, inclusive of available geologic and geophysical data, EDS met the requirements of 40 CFR Part 148 subpart C. EPA's technical review did not indicate the presence of conduits that would allow waste to escape from the injection zone. The geophysical logs of the wells themselves were carefully checked for fractures with movement, and none was found. The scattering of exploratory wells in the area has also failed to identify any fracturing.

52. Comment: Very detailed underground fluid migration tests in Oklahoma in shallow wells hundreds of feet apart in geological strata similar to those in southern Michigan showed migration of fluids through previously unknown pathways.

Response: The scale dependence of permeability is well known. An interference test between EDS's wells tested the largest practicable volume of rock in the area of the wells. The test results were matched using a model which is consistent with other information known about the geology including radial flow undistorted by flow through fractures. This model is the basis of the no migration demonstration. The fact that the study in Oklahoma involved shallow wells differentiates its situation from that in southeast Michigan where there are many more layers of containment and lithostatic pressures tend to close rather than open fractures.

EPA notes that the injection zone is not a shallow geological stratum, since the top of the injection zone is 3,369 feet below ground level. Additionally, EPA notes that a confining zone of approximately 1,000 feet in thickness overlies the injection zone and separates it from the lowermost USDW. Prior to issuing the Class I UIC hazardous waste

injection well permits, EPA's technical review showed that the confining zone met the siting requirements of 40 CFR § 146.62(c)(2) including that it is: (1) laterally continuous; (2) free of transecting, transmissive faults or fractures over an area sufficient to prevent fluid movement; and (3) of sufficient thickness and with lithologic and stress characteristics to prevent vertical propagation of fractures. Descriptions of both the confining and injection zones' characteristics are listed in the Notice of Intent published in the Federal Register (67 Fed. Reg. 77981, December 20, 2002).

Concerning migration of fluids, EPA notes that the plume modeling detailed in the petition is not intended to predict the actual plume behavior for 10,000 years, but to "bound" the area of potential plume migration as discussed in the preamble to the 40 CFR Part 148 regulations (53 Fed. Reg. 28117, at 28126 - 28127, July 26, 1988). By "bounding," the modeling essentially predicts what will not occur through the use of conservative data and assumptions. Where some uncertainty exists for site-specific data, sensitivity analyses, per 40 CFR § 148.21(a)(6), provide a range of error, or worst case demonstrations, to further "bound" model predictions. The EDS demonstration of waste plume movement included extremes of density values to bound the movement of the waste. EPA notes that by bounding the plume, it moved significantly farther than several hundred feet laterally and less than 300 feet vertically. Based on EPA's technical review, EDS met the requirements of 40 CFR Part 148 subpart C.

53. Comment: According to local records and general knowledge about the area gained through lake bed resonance, quarries, mining, and petroleum operations, there is ample evidence that there are many areas in the proposed zone that provide transmissive faults or fractures. One reason that the area provides so much natural gas is that there are many transmissive fractures and faults throughout the area.

Response: No such records have been presented to EPA as evidence. Except for petroleum operations, the activities listed above are not capable of providing information about fractures in deep geological formations. Fractures often occur near the surface as a result of pressure relief due to the removal of overlying rock due to erosion. Many hundreds of feet of rock have been eroded in the area of the wells, so the mere existence of fractures at the surface is a poor indication of fractures at depth.

There is little natural gas native to the immediate area. No hydrocarbons have ever been produced from the rocks correlative to the injection zone within the State of Michigan. Some traces of gas and oil have been recorded in a number of shallow zones in the area, but not in deeper zones. Oil and natural gas may migrate along transmissive fractures, but there are also many faults which serve as impermeable boundaries and form traps

for oil and gas. Because of the absence of hydrocarbons from the deeper formations, very few wells have tested them, and the few wells drilled to test for hydrocarbon would not produce records which could be used as evidence of fractures.

54. Comment: It is generally known that the layers presented as impermeable are filled with water and are fractured.

Response: EPA disagrees. Any porosity in rocks below the water table is normally filled with water unless the water has been displaced by oil or gas. The presence of water in the layers beneath the water table does not mean that there is fracturing. The evidence EPA reviewed as described above, indicates that the confining zone and containment interval in the injection zone are not fractured.

55. Comment: EPA should quantify the risk that an unknown fault would one day be found in the area of review for the injection wells. Approval should not be granted without such a risk analysis.

Response: The regulations include a standard for petitioners at 40 CFR § 148.20(b). This standard requires the petitioner to "identify the strata within the injection zone which will confine fluid movement above the injection interval and include a showing that this strata is (sic) free of known transmissive faults or fractures..." There are no known transmissive faults or fractures within the injection interval. EPA has determined that the proposed EDS injection is protective of human health and the environment.

56. Comment: The DOT should have been consulted about results of drilling it did when planning the construction of I-94.

Response: The sampling done by the DOT did not reach the zones which are relevant to containment of the injected wastes. There is no reason to drill exploratory tests for foundations below bedrock and wells reaching the confining and injection zones cost over one hundred thousand dollars to drill. Therefore, we assume that none of these wells penetrated the 3,800 feet of bedrock overlying the injection interval.

57. Comment: How do you reclaim something once it has been injected deep into the earth?

Response: Deep underground injection is a method to permanently dispose of hazardous waste. Waste disposed of in this manner is not intended for reclamation. RCRA allows for this method of disposal of restricted hazardous waste if EPA determines that the disposal will be protective of human health and the environment for as long as the waste remains

hazardous. See RCRA Section 3004 (f)(2) and (g)(5), 42 U.S.C. § 6924 (f)(2) and (g)(5).

58. Comment: The Site Review Board said that the formation fluid within the Mt. Simon is practically more toxic than the wastes which EDS would inject. EPA says that the Mt. Simon water is just a hard salt brine. What is the truth?

Response: The Mt. Simon formation water is a salt brine which contains 270,000 mg/l of total dissolved solids. Reference to a material data sheet[6] for a manufactured salt brine having a concentration of 250,000 mg/l of sodium chloride indicates the following acute health effects:

> INHALATION: Mist may cause mild temporary irritation of the respiratory tract.
> SKIN CONTACT: Direct contact with damaged skin can cause mild irritation. Absorption can occur with effects similar to ingestion.
> EYE CONTACT: Causes temporary eye irritation, redness, tearing and mild pain if concentration exceeds that of normal body fluids.
> INGESTION: Non-occupational ingestion of very large quantities has produced nausea, vomiting, diarrhea, and prostration. Dehydration and congestion occur in most internal organs. Hypertonic salt solutions can produce violent inflammatory reactions in the gastrointestinal tract. Cerebral edema, pulmonary edema, blood cell shrinkage, and brain damage may also occur. Death may result from cardiovascular collapse or damage to the central nervous system.

IX. Comments About the Method of Simulation

1. Comment: In Volume I of the petition we read that, "Since the plume drifts at constant speed, we neglect variations in time and space." This is not so, it will move in bubbles and through fingering at different speeds in different directions which cannot be deduced.

Response: The statement quoted, taken from the segment of the petition discussing the calculation of the effects of dispersion, refers to buoyancy driven motion under which the center of the plume moves at a constant speed if the plume is generally intact. In fact, the speed will decrease through time as a result of mixing. The assumption that the plume moves at a constant speed accordingly produces a conservative bias, overestimating the total distance traveled. The purpose of the calculation of the effects of

[6]Nexen Chemicals Canada Limited Partnership, 100 Amherst Avenue, North Vancouver, British Columbia, Canada V7H 1S4

dispersion is to bound the effects of the fingering action, which cannot be deduced in detail. The petition used the conservative assumption of a plume moving at a constant speed to calculate the boundaries of dispersion, including dispersion through fingering. Conservative assumptions help us estimate the outer bounds of plume movement. Incorporating variations in speed would have resulted in a smaller estimate of plume movement. The waste does not travel in bubbles because it and the formation water are a continuous phase with no sharp interface.

2. Comment: In volume I we read: "if the entire waste plume is approximated as being released at a point at time zero, then this becomes equivalent to the classical problem of an instantaneous heat source in a moving fluid, or an instantaneous moving point heat source." These inferences are false and all of the equations following this are false and do not provide accurate or logical results.

Response: These analogies have long been used in the study of mass movement in the subsurface. According to Freeze and Cherry (1979)[7], "The mathematical methods upon which classical studies of ground water flow are based were borrowed from areas of applied mathematics originally developed for the treatment of problems of heat flow, electricity, and magnetism." Most texts dealing with ground water flow acknowledge the application of the study of heat, magnetic, and electrical flow to ground water flow.

3. Comment: The discussion on page 46 is unduly concerned with the motion of the plume center, and most of the math in these problems concerns itself falsely with the drifting of the plume center.

Response: It is necessary to estimate the distance the plume center moves to have a basis for estimating the movement of the margins.

4. Comment: I was told that EDS used three software packages, PHIST, INTERACT, and SWIFT II. Only INTERACT and SWIFT II were mentioned in the petition. PHIST is a generalized histogram plotting program with various format controls.

Response: PHIST (from pressure history), and INTERACT (from pressure interaction), were developed by engineers at Subsurface Technology, then Ken Davis, Inc., during the late 1980s for the purpose of simulating pressure responses to injection. The application of PHIST to the demonstration is introduced on page 31. The program code is included in the petition as Attachment VI.A.1(a)-2. This program was used to assess

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[7]Freeze, R. Allan, and Cherry, John A., 1979. Groundwater, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 553 p.

pressure responses to injection and match fall-off testing results. Although the programs were reviewed by both Regions 5 and 6 and approved for use at that time, Region 5 asked Dr. Chin-Fu Tsang of LBNL to verify the program codes in 2002. The codes were verified as capable of solving the necessary equations and validated as appropriate for application to the EDS land ban demonstration.

5. Comment: SWIFT II software provides applications for wavelength scanning, etc. It was created by Biochron, Limited.

Response: The SWIFT II program described by the commentor is different from that used by EDS's consultants. The SWIFT II software used by The Subsurface Group, part of Subsurface Technology, Inc., was originally developed as the Survey Waste Injection Program for USGS. It has been enhanced through the years. In 1981, the name was changed to the Sandia Waste Isolation Flow and Transport (SWIFT) program. SWIFT II was introduced in 1986. Although there are subsequent versions, SWIFT II is commonly used unless the addition of fracture flow is required The program is in the public domain and information is readily available.

6. Comment: I was told that the Region 5 Office of EPA does not have the software that the EDS consultants have. That is, EPA could not and did not verify the results of the mathematical modeling performed by an unknown third-party consultant to EDS.

Response: EPA does not have identical software. As described in the petition text, most of the computations used are relatively simple empirical relationships which can easily be incorporated into any spreadsheet program. Accordingly, EPA has developed its own computer programs which it used to verify the results of the modeling. EPA identified a number of errors in the use of the calculations during the course of review. As evidenced by the comments EPA made in reviewing the petition, EPA carefully checked and verified the mathematical modeling submitted by EDS and its consultant.

7. Comment: The results of the mathematical studies of material flow submitted for review to EPA are flawed in content and output. Examination of the input parameters is flawed. Expected levels of flow and the introduction of wishful thinking are indicated by the preliminary figures and the arrangement of the final output. Contrary mathematical figures and flow charts can be made available when EPA provides for the acceptance of this material.

Response: During the public comment period, EPA invited the commentor to submit the information referenced, but did not receive such information.

X. Comments on the Results of Simulation

1. Comment: There has been adequate evidence given to EPA and DEQ to justify denial of the petition. Neither the DEQ nor EPA has adequately addressed the huge amount of risk to the community concerning this well.

Response: EPA disagrees that the EDS injection wells pose a risk to the community. The Agency believes that properly constructed and operated Class I injection wells are a safe and effective disposal technology. Since the implementation of the federal UIC program, there have been no confirmed cases of fresh water aquifer contamination due to hazardous waste injection through a properly operated Class I well. The current EPA UIC regulations provide additional well monitoring and construction safeguards against the potential for well failures to adversely impact the environment.

EPA's decision to deny or approve a facility's no migration petition is based upon the 40 CFR Part 148 requirements that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for 10,000 years. EDS submitted a detailed technical assessment for its no migration demonstration. EPA reviewed in detail this no migration petition and concluded that EDS had satisfied the 40 CFR Part 148 subpart C requirements prior to proposing a decision. Additionally, all comments, technical data, and facts submitted during the public comment period were evaluated and considered by EPA before a final decision was reached on the EDS petition.

2. Comment: The fact sheet and official report are filled with falsehoods.

Response: EPA disagrees. EPA required EDS to submit an appropriate signed certification statement in accordance with 40 CFR § 148.22(a)(4) certifying the accuracy of the no migration demonstration submitted for review. EPA reviewed in detail the no migration petition, and checked assertions made in the petition against other sources. The Notice of Intent was prepared from information included in the no migration demonstration. It was included in the administrative record and made available to the public during the public comment period.

3. Comment: EPA should clarify the word “fact” as intended in the Fact Sheet. Is the intention to describe things which have really occurred or to describe things which are alleged to be or might occur?

Response: As described at 40 CFR § 124.8, the Fact Sheet briefly set forth the principal facts and the significant factual, legal, methodological and policy questions considered in preparing the draft decision. The Fact Sheet provided a synopsis of the results of the no migration demonstration and a

listing of the proposed petition conditions. The plume modeling summarized in the Notice of Intent is not intended to predict the actual plume behavior for 10,000 years, but to "bound" the area of potential plume migration, both vertically and horizontally, as discussed in the preamble to the 40 CFR Part 148 regulations (See generally 53 Fed. Reg. 28117, at 28126 - 28127, July 26, 1988).

4. Comment: Tom Wellman, MDEQ, and Douglas Wicklund, EDS, both stated that wastes would move toward the deepest part of the basin to the northwest of Romulus, but the Notice of Intent says that the direction of greatest movement will be to the south-southeast.

Response: Waste will migrate northwestward toward the center of the basin if it is more dense than the brine which currently resides in the injection interval. The no migration demonstration accounts for worst-case situations by assuming first that all of the waste is as dense as the densest waste which might be injected and calculating the distances of migration. Then the demonstration includes new calculations of the migration distances assuming that all waste is as light as the lightest waste that might be injected. The brine in the injection zone is quite dense, and it is more likely that the waste will be somewhat lighter than the brine and will actually migrate updip toward the south-southeast. However, this calculation assumed that the density of the waste is much less than that of fresh water; so the actual distance of movement will probably be less than the calculated distance.

5. Comment: Statements about the distance of waste movement in the Notice of Intent differ from those made previously by EPA and MDEQ employees.

Response: Earlier statements were based on estimates in the context of the operating life of the wells. The no migration demonstration took a more conservative approach than was used in the permitting process. As a result, the estimate for the greatest amount of movement through the first 20 years of the injection wells' lives was estimated at 16,800 feet to the southwest, taking into account the influence of injection by SPMT. This is close to previous estimates. Some of those estimates were made with no consideration of dispersion of flow or the effects of the SPMT injection.

6. Comment: Even assuming the modeling as performed is correct, the plume will soon be in contact with the subterranean flows associated with the Detroit River and the Rouge River.

Response: EPA disagrees. If the modeling is correct, then the plume will still be at least 3,600 feet beneath the surface after 10,000 years. Subterranean flows associated with rivers are restricted to the near surface zones less than 400 feet from the surface.

7. **Comment:** The Notice of Intent contradicts itself. The document asserts that the waste will remain three quarters of a mile beneath the surface but in the next paragraph it states that the waste will travel sideways from the bottom of the well for 4 ½ miles in all directions, and 10 miles to the southeast.

Response: The no migration demonstration addressed the vertical and horizontal containment of waste movement as required in 40 CFR §§ 148.20(a)(1)(i)(A) and (B). As discussed in the preamble of the 40 CFR Part 148 regulations, the no migration demonstration is not intended to predict the exact plume behavior for 10,000 years, but rather what conditions will not occur. (See 53 Fed. Reg. 28117, at 28126 - 28127, July 26, 1988.) EDS provided conservative modeling to "bound" the area of potential vertical and horizontal plume migration.

The comment may be confusing statements about vertical and horizontal movement. The Notice of Intent asserts that the waste will travel vertically no more than 250 feet upward. The second statement says that waste in hazardous concentrations will travel between 4 ½ and 10 miles horizontally, depending on direction. In order to describe the movement of waste in a three-dimensional space in which horizontal movement is strongly favored, it is necessary to differentiate movement in all directions, particularly in the horizontal and vertical directions. Taken as a whole, the document is asserting that although horizontal movement might be as great as the horizontal distances stated, vertical movement will never be more than a few hundred feet and the result is that the waste will remain almost three quarters of a mile below the surface

8. **Comment:** EPA's lead reviewer is quoted in the June 10, 2001 *Heritage Sunday* saying that the movement of the EDS toxic waste plume "...will be less than 10 miles..." In the June 29, 2001 Heritage Sunday he stated that ".. would be less than 10 miles..." These statements are at odds.

Response: Both statements say that the waste movement will be less than 10 miles. (Parts of the statements inside the commentor's quotes were the conclusions of the writer, not the reviewer's words). The final demonstration of no migration predicted a movement of 52,990 feet to the south-southeast. This is just slightly greater than 10 miles. It is an over prediction based on very conservative assumptions. In reality, the movement over the 10,000 year period of the simulation will be less than 10 miles.

9. **Comment:** If the waste moves 10 miles to the southeast, it will cross the Canadian border.

Response: As the map included in the Notice of Intent and displayed at the public hearings shows, the plume boundary does not reach the Canadian border.

The map, as part of the Notice of Intent can be examined at www.epa.gov/region5/water/uic/pubpdf/factsheet.pdf.

10. Comment: We in Michigan are blessed to be surrounded by the Great Lakes, a fresh water supply, and if there is even a 1% chance of problems from toxicity from this well we are gambling with the largest fresh water supply in the nation, not to mention the ground water pollution for generations to come.

Response: Based on the no migration petition review, the local drinking water supply and Great Lakes watershed are not in danger of contamination from the proposed injection wells. The Great Lakes and Detroit River are relatively shallow compared to the depth of the well. The western basin of Lake Erie is less than 200 feet deep. EDS has demonstrated that the confining shales are laterally continuous with sufficient thickness and low transmissive properties to restrict vertical waste movement. This demonstration was made by using well logs and core analyses to characterize the confining shale. The injection zone is isolated geologically from surface water bodies by these confining zones.

11. Comment: An understanding of the reservoir would require patterned drilling. No such drilling has been done.

Response: EPA disagrees. EPA has determined that the information presented by EDS and that independently obtained is sufficient to show that the hydrogeological and geochemical conditions at the site and the physiochemical nature of the waste streams are such that reliable predictions can be made that fluid movement conditions are such that the injected fluids will not migrate within 10,000 years vertically upward out of the injection zone; or laterally within the injection zone to a point of discharge or interface with a USDW. The testing and monitoring requirements for Class I hazardous waste injection wells at 40 CFR § 146.68 do not include requirements for patterned drilling. The records from existing drilling of the deep formations confirm that the formations are widespread and that characteristics favorable for waste disposal are present over the area which will be affected by the proposed injection. Patterned drilling is impractical in the case of deep injection wells because of the cost of drilling wells and the potential impact of drilling multiple wells through the injection zone within the area of review.

12. Comment: EDS presented no geophysical facts to support the proposed hypothetical geological model shown in a newspaper article in 2000.

Response: EPA disagrees. The geological model utilized in the EDS no migration demonstration is based upon numerous geophysical logs including open hole resistivity, porosity, and fracture logs of area wells. EPA's technical review of the petition included an extensive review of area and regional

subsurface geologic data such as core data, well logs, formation fluid samples, cross sections, and structure and thickness maps. Geological information provided in the EDS no migration document satisfied requirements for petition geological data as detailed in 40 CFR §148.20 and §148.21. Based on EPA's technical review, EDS met the requirements of 40 CFR Part 148 subpart C.

13. Comment: EDS cannot make a demonstration of no migration if the proposed extraction of brine by SPMT is taken into consideration.

Response: EPA has considered the SPMT proposals. Although a well is proposed, it has not been drilled and, if drilled, may only be drilled to the depth of the Lockport Dolomite, which is above the confining zone and would not impact EDS's demonstration. As discussed below, there is a reasonable degree of certainty that SPMT will not extract from the injection zone if EDS injects hazardous waste. If SPMT were to begin extracting from the injection zone, the exemption would terminate pursuant to its terms. Under current conditions, EDS has met the demonstration required by 40 CFR Part 148 subpart C.

14. Comment: SPMT has not yet disclosed the full extent of its proposal to any regulatory agency. It is not possible for EDS to incorporate a plan which has not been disclosed.

Response: EPA based its determination on current conditions.

15. Comment: The fact sheet says that "EDS had to prove its hazardous substances would not move to the surface or seep into underground drinking water for at least 10,000 years. Experts figure that after that long many of the chemicals will have turned harmless." One commentor asserted that such transformations imply that some wastes will become more hazardous.

Response: The demonstration EDS submitted does not rely on waste transformation. The no migration demonstration addressed containment of both vertical and horizontal waste movement which would include dilution of wastes. As part of its no migration demonstration, EDS addressed the issue of waste compatibility with both the formation fluid and injection zone. EPA reviewed in detail the no migration petition and concluded that EDS has demonstrated, to a reasonable degree of certainty, as required by 40 CFR Part 148, that waste will not migrate from the injection zone for at least 10,000 years. EDS met its demonstration by showing, pursuant to 40 CFR § 148.20(a)(1)(i), that the hydrogeological and geochemical conditions at the site and the physiochemical nature of the waste streams are such that reliable predictions can be made that fluid movement conditions are such that the injected fluids will not migrate within 10,000 years vertically upward out of the injection zone; or laterally within the

injection zone to a point of discharge or interface with a USDW. The demonstration assumed that the injectate will be a single chemical which is toxic at a concentration of one part in one trillion. Fewer than 10 chemicals which might be injected are toxic at that level. The demonstration shows that even if the hypothetical chemical is the most mobile molecule known, it will not migrate as far as 250 feet above the top of the injection zone.

16. Comment: The hazardous waste will be contained until it is no longer hazardous. How many hundreds of years is that?

Response: Under 40 CFR Part 148, the Agency established a 10,000 year time frame for no migration demonstrations. These regulations require petitioners to use predictive modeling to form the basis of a no migration petition demonstration. Issues concerning the use of the 10,000 year time frame and acceptance of models were discussed in the preamble to the final 40 CFR Part 148 regulations (See 53 Fed. Reg. 28117, at 28126 - 28127, July 26, 1988). The Agency specified the 10,000 year time frame not because migration after that time was of no concern, but because it believed a site which could meet a 10,000 year period would both provide containment for a substantially longer time frame, and allow time for geochemical transformations which would render the waste non-hazardous or immobile. EDS demonstrated the waste will be contained within the injection zone for 10,000 years even using conservative assumptions and worst-case scenarios.

17. Comment: There will be persistent chemicals in the EDS well.

Response: It is true that some chemicals injected into the well will be very stable and will travel as far as the liquid carrying them will. However, that liquid will be mechanically confined for more than 10,000 years as discussed above.

18. Comment: Mr. Fitch of the MDEQ provided information to EPA in relation to this high pressure toxic waste injection well. His position with the MDEQ is responsible for the Oil and Gas portion of that department. Any information provided by him should be reviewed since his expertise is limited to material extraction and not high pressure toxic waste injection methods.

Response: As EPA has not authorized the State of Michigan for the exemption provisions of 40 CFR Part 148, promulgated under the HSWA amendments to RCRA, or granted primacy to the State of Michigan for an underground injection control program under SDWA, it is EPA that currently reviews petitions under 40 CFR Part 148 for deep injection wells located in the State of Michigan. EPA's decision to deny or approve a

facility's no migration petition is based upon a detailed technical assessment of the no migration demonstration. The no migration petition submitted to EPA by EDS satisfied the requirements in 40 CFR Part 148 subpart C. Information received by EPA from all parties, including the public as well as the State, was reviewed in detail.

19. Comment: What is the status of the EDS soil tests?

Response: Soil testing is generally performed on surface or shallow subsurface soils to address soil conditions or contamination at or near the surface. The EDS injection wells will emplace restricted hazardous waste in an injection interval which begins approximately 3,900 feet below ground level. The injection zone and confining layers are hard rock rather than soil. Sampling of the injection zone rock was obtained in the form of the examination of cuttings and testing of core samples, as well as a number of reservoir tests.

XI. Well Search within the Area of Review

1. Comment: There has not been a complete catalogue of all abandoned wells in the area. During the 1930's there were several wells drilled around the airport looking for oil. Because there is good reason to believe that there are unknown abandoned wells in the area, the modeling cannot be assumed to be complete and accurate.

Response: EPA reviewed EDS's protocol for locating artificial penetrations and determined that the petitioner conducted a complete search for artificial penetrations within the AOR. The search involved a thorough review of State and private maps and drilling and plugging records. The records for the artificial penetrations located in the area of the airport that were drilled in the 1930s were shallower than the EDS wells and do not affect the no migration demonstration. EPA determined that EDS's AOR protocol satisfied the requirements of 40 CFR § 148.20(a)(2)(ii) for no migration petitions.

2. Comment: EPA should search for unknown wells in various archives.

Response: The State's records are complete for wells drilled after 1934. The State records also include information which the State has been able to collect on earlier penetrations. Further, because no oil and gas have ever been found in the Michigan Basin in formations deeper than the Trenton at a depth of 2,956 feet at this site, there is little reason for deeper wells to exist in this area. If they did exist, they would probably have closed over the last 70 years as a result of flowing of rock with low compressive strength which exists between the injection zone and the lowermost

USDWs. EDS has met the requirements for area of review at 40 CFR §§ 146.63 and 148.20(a)(2)(ii).

XII. Quality Assurance Project Plan

1. Comment: What is the result of EPA's review of the quality assurance plan prepared for the landban exemption?

Response: Regulations at 40 CFR § 148.21(a)(4) require that an approved quality assurance (QA) plan shall address all aspects of the demonstration. EDS submitted a QA plan with the petition and it was reviewed by EPA staff and revised several times before being approved on November 1, 2001. An addendum to the plan was submitted and approved when previously unplanned reservoir testing occurred in July, 2002. This testing generated data used to fine tune and confirm the accuracy of the geologic model for predicting pressure response to injection.

XIII. Results of the EPA Review

1. Comment: Has EDS met the no migration requirement?

Response: EDS has met the requirements of 40 CFR Part 148 subpart C, including the requirement at 40 CFR § 148.20(a)(1) to demonstrate that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous.

2. Comment: Does the record document this demonstration?

Response: Yes.

3. Comment: The MDEQ's permit restricts injection to non-ignitable and non-reactive wastes while the exemption appears to allow the injection of such wastes (D001 and D003). The commentor requested confirmation that the facility would not inject reactive or ignitable wastes, and asked that the D001 and D003 coded wastes be removed from the list of exempted wastes.

Response: The exemption does not override the restrictions in the MDEQ permit. Furthermore, EPA's UIC permits for the EDS well also preclude injection of ignitable and reactive wastes. The exemption allows the petitioner to inject hazardous wastes banned from land disposal by the HSWA based on a showing that all RCRA-regulated wastes, including D001 and D003, will be contained in the injection zone for a period of 10,000 years. The more restrictive requirement applies. However, for consistency with the EPA

permit, EPA has removed D001 and D003 from the list of codes for restricted wastes which EDS may inject.

4. **Comment:** The granting of the land ban exemption is contrary to the present laws of the State of Michigan governing land use, wells, and mines. EPA is attempting to take precedence over the rights guaranteed to the people of the State of Michigan as guaranteed in the Constitution of the State of Michigan. As a result, EPA in this case by attempting to grant a land ban exemption, is attempting to take precedence over the Constitution of the United States.

Response: RCRA provides for the granting of exemptions from the RCRA LDR if the standard is met. This determination only grants an exemption from the LDR. EDS would still need to obtain any approvals it needs to proceed under State law. Indeed, EDS has obtained a permit from the State of Michigan for construction of its wells and is seeking a license from the State for operation of a hazardous waste facility. Please note as well that the State of Michigan has been authorized to grant exemptions to the RCRA LDR for other methods of land disposal under its analog to 40 CFR Part 268, but has not received authorization for 40 CFR Part 148.

5. **Comment:** EPA should provide a full understanding of the federal regulations EDS must still adhere to or any permits that must be obtained regarding the surface storage facility constructed at the Citrin Drive site.

Response: EDS's operations are subject to regulation under SDWA and RCRA as well as State law. The regulations promulgated under the SDWA at 40 CFR Parts 124, 144, 146 and 147 govern EDS's underground injection control permit. The regulations promulgated under both SDWA and RCRA at 40 CFR Part 146 and 148 govern the exemption from the LDR for deep well injection. EDS's hazardous waste treatment, storage, and disposal activities are also subject to RCRA requirements for hazardous waste treatment, storage, and disposal facilities. As the State of Michigan has been authorized under RCRA Section 3006 to administer most of those requirements, the State analogs to such RCRA requirements would apply, and EDS would need to obtain a hazardous waste facility operation license from the State requiring compliance with those requirements, including but not limited to RCRA corrective action. Many of those requirements are located at Mich. Admin. Code. §§ 9601-9631 and 1103. EDS's operations may also be subject to other State requirements, such as the State water laws.

XIV. Extent of the Effects of Injection by EDS

1. Comment: The salt mines in the area go for several miles. Will the injection well impact the salt mines?

Response: The salt mines are located at depths between 1,200 and 2,000 feet. In Section VI of the no migration petition, EDS demonstrated that wastes will be contained below a depth of 3,600 feet. The Notice of Intent published in the Federal Register (67 Fed. Reg. 77981, December 20, 2002) provides detail concerning both the injection and confining zones. The Notice of Intent listed the depths of the EDS injection interval, injection zone, and confining zone, demonstrating the large amount of separation between the top of the EDS injection zone and the base of the salt mines. Based on EPA's technical review, EDS demonstrated that, to a reasonable degree of certainty, there would be no migration of hazardous constituents from the injection zone for 10,000 years. Accordingly, the proposed injection will not contaminate the salt mines.

2. Comment: In Figure 2, the map displays a "plume" formed in a manner different from the manner in which the attendees at the meeting were told. The attendees were informed that the method of waste injection has been changed since the inception of the project. The method of waste injection that had been initially proposed was by injection in a continuous stream. It has come to light that many types of waste would be injected. Many of them will interact with each other in a negative fashion. In order to avoid "mixing" EDS would inject a load of waste, then a buffer of brine, then the differing load of waste followed by a load of brine and so on. The intention stated at the meeting was to ensure that perfect alternating bands of waste and buffer would be formed within the injection substrate and would never, during the course of 10,000 years, mix. The wastes would, nevertheless, mix following injection.

Response: The plume modeling detailed in the petition is not intended to predict the actual plume behavior for 10,000 years, but to "bound" the area of potential plume migration, using conservative parameters and worst case conditions, as discussed in the preamble of the 40 CFR Part 148 regulations (See 53 Fed. Reg. 28117, at 28126 - 28127, July 26, 1988).

The mixing of wastes and formation fluid will occur in the subsurface whether the waste is continuously injected, or batched and intermittently injected. The EDS demonstration was based on continuous injection at the maximum rate, thereby maximizing the pressure buildup and lateral plume movement. This demonstration addressed the issue of waste compatibility within the reservoir fluid and the injection zone as well as the containment of such wastes. The demonstration also addressed well construction and waste compatibility with well materials.

3. **Comment:** What will the effect of the wells be on the water table? The water table is too high to accept the risk that the injection wells could impose.

Response: The top of the injection zone located at 3,369' is geologically isolated from the lowermost USDW by several confining layers. Because there will be no flow of fluid from the injection zone to the fresh water aquifers, there will be no effect on the water table.

4. **Comment:** The EDS wells will affect structures on the surface. The EDS decision process should be shelved until all those responsible for the safety of these structures are consulted.

Response: EPA reviewed in detail the no migration petition and concluded EDS has demonstrated that, to a reasonable degree of certainty as required by 40 CFR Part 148, wastes will not migrate from the injection zone for at least 10,000 years. Accordingly, EPA believes the operation of the EDS injection wells under the no migration petition is protective of human health and the environment and will not result in contamination of USDWs. Based on EDS's demonstration, the proposed EDS injection should not affect anything above a depth of 3,600 feet below the surface, the surface, areas above the surface, or structures located thereon.

5. **Comment:** The injection well will introduce highly saline and reactive chemicals whose thermophysical properties are quite different from those of water. Further changes in flow behavior could result from chemical alterations between the sediments and liquids.

Response: EPA disagrees. As described in Section 2.72 of EDS's application for a Part 111 permit, the injected chemicals will be primarily solutions of acids and bases containing metals, and some organic liquids in concentrations less than 10% in water. The injected liquid will be mostly water and the properties of the injectate will not differ greatly from those of pure water. The demonstration included a range of physical properties to account for any differences. Differences in flow behavior due to varying viscosity, etc. will not have environmental consequences and are less than are accounted for in the estimates of dispersivity. The sand and shales in the injection zone are very nonreactive. It is not likely that they will be significantly affected. The most likely effects are small changes in porosity and permeability. These changes will occur in isolated locations and will not lead to adverse environmental effects. In addition, disposal of wastes which are defined as reactive according to the regulations (40 CFR § 261.23, waste code D003) is prohibited by the permit and the exemption.

6. **Comment:** The chemicals being discussed and the pressures they will be exposed to will lead to diffusion rates which are currently unknown as they have not been studied.

Response: The diffusion rates can be bounded because they are governed by known, measurable physical factors. The no migration demonstration used the highest diffusion rates and assumed a source which remained at 100% concentration at the farthest extent of pressure-driven migration for 10,000 years. These are very conservative assumptions. The true diffusion rates are very low and they result in movement over significant distances only because the times over which they operate are very long. The pressure does not greatly alter the physical properties of water.

7. Comment: From the known information, there is good reason to expect subsidence sometime early and throughout the operation of the well.

Response: EPA disagrees. Subsidence requires the removal of material from around the well to create a volume into which material can fall. The Mt. Simon Sandstone is not subject to erosive attack by either acidic or basic wastes. This is demonstrated by the integrity of well bores which have been used to inject acidic and basic wastes for over 30 years.

8. Comment: The geologic formations vary from place to place such as from one side of Michigan to the other side of the State and from state to state.

Response: EPA recognizes that geologic conditions do vary and therefore each no migration demonstration is reviewed based on site-specific information. Regional and local geologic conditions were addressed by EDS in the no migration petition as required by 40 CFR § 148.20(a)(1) and (b) and § 148.21(b). The petition provided by EDS met the requirements of 40 CFR Part 148 subpart C. Based on EPA's technical review of EDS's demonstration, the requested injection interval is capable of containing injected wastes for the required 10,000 year time frame. EPA has determined that the EDS injection wells are protective of human health and the environment.

9. Comment: EDS attempted to operate a deep injection hazardous waste well at a different location in Wayne County, Michigan. However, because soil at this site was found to be unsuitable for storing hazardous waste, the well was abandoned. What were EPA's findings in regard to this site's geological data? What were the specific geological characteristics present at this site that made it unsuitable for use as a deep injection well, and are these same geological characteristics present, or likely to be present, in other areas of Wayne County?

Response: EPA assumes that the commentor is referring to the EDS well drilled at the Wahrman Road site in 1993. EDS chose to move its facility to Citrin Drive due to issues associated with the surface facilities, not because of geological suitability for waste disposal. Geological data from the 1993

EDS well at the Wahrman Road site and both EDS wells at the Citrin Drive site were included in the petition and utilized in the no migration modeling demonstrations. That well has not been abandoned. EPA notes that both locations satisfied 40 CFR § 146.62 siting criteria for Class I hazardous waste injection wells as well as 40 CFR § 146.65 construction requirements. EDS will be required to plug the Wahrman Road well when the Citrin Drive facility is licensed for operation. If the Citrin Drive facility is not licensed, then EDS may attempt to locate its facility at the Wahrman Road Site.

XV. Risk Arising from Seismic Events

1. Comment: No surface monitor system is proposed by the permit applicant in Michigan. Seismic activity induced as far as three miles from a 14,000 foot well in southwestern Colorado suggests that fractures outside the radius of the area of review of a Class I well might be affected.

Response: The area of review around the EDS wells has a radius of more than six miles centered at the point midway between the two wells at the Citrin Road site. The regulations implementing the LDR at 40 CFR § 148.20(b) require a showing that the strata which will confine fluid movement above the injection interval are free of known transmissive faults or fractures. There are no known transmissive fractures within the area of review. The potential for seismic activity of the region was also considered by EPA prior to approving the UIC permit in accordance with 40 CFR § 146.62(b)(1).

2. Comment: The Notice of Intent says that earthquakes are rare and relatively weak in this area and that the shafts should, not would, be able to withstand the vibrations. Thus, there is no guarantee. If there is an earthquake, the well could poison the Great Lakes. In the last 20 years there have been two earthquakes in this vicinity. One occurred in Ohio and it shook a house located about three miles south of the proposed site.

Response: An analysis of seismic risk occurring at the EDS facility is presented in Section III.D of the no migration petition. The wells' casings could be sheared in the unlikely event that movement occurs on a fracture which actually is penetrated by the well bore. However, vibrations from an earthquake will not affect the integrity of the wells. As discussed above, no faults cutting the well bores were identified. EPA reviewed information from the National Earthquake Information Center (NEIC) in Boulder, Colorado regarding earthquakes in the area of the injection wells. The NEIC reported that the nearest earthquake was 41 kilometers, about 25 miles, away and occurred in 1980. Two other earthquakes have occurred within 100 km, about 61 miles, of the wells. Southeastern Michigan lies in

a stable continental area where there is little risk of new faulting. Earthquakes in continental areas are usually deeper than the sedimentary strata penetrated by the well. Thus, there is a reasonable degree of certainty that the wells' casings will not be sheared. Moreover, injection in areas of high seismic activity such as Alaska, California and southern Illinois and Indiana have withstood earthquakes. EPA additionally notes that the well will be continuously monitored throughout the operational life under the UIC permit. Among other things, annual mechanical integrity tests (MITs) are required to demonstrate mechanical integrity of the casing, tubing and packer, and demonstrate there is no significant fluid movement into a USDW through vertical channels adjacent to the injection well bore.

XVI. Comparisons to Other Injection Well Operations

1. **Comment:** There have been environmental and public health problems associated with commercial disposal wells in other states including Ohio, Louisiana, and Texas. These problems include: 1) hazardous waste spills; 2) millions of gallons of lost hazardous waste that have escaped the injection zone; 3) unexplained birth defects, diseases and deaths; 4) unexplained animal mutations, infertility, and deaths; 5) unexplained contamination in surface water and ground water supplies; 6) high and continually increasing cancer rates; 7) noxious and toxic fumes; and 8) devastated property values with property assessments lowered by as much as 20 percent. EPA should reconsider based on these problems.

Response: Since the implementation of the federal UIC program, there have been no confirmed cases of fresh water aquifer contamination due to hazardous waste injection through a properly operated Class I well. More specific information about the alleged problems in Ohio, Louisiana and Texas can be found below.

As mentioned above, EPA's determination on EDS's petition under 40 CFR Part 148 subpart C is limited to providing an exemption from the LDR for deep well injection, and does not preclude any other approvals and/or requirements. Please note as well that, as part of its Part 111 construction permit, EDS entered into an agreement with the Environmental Concerns Association (ECA) which, among other things, addresses truck routes, noise, odor, and residential drinking water well monitoring, and agrees to pay damages to ECA members whose legally zoned residence located within 1.5 miles of the wellheads has decreased in value solely due to operation, subject to certain conditions.

2. Comment: Several series of earthquakes which occurred near Ashtabula, Ohio in 1987 and 2001 have been attributed to a Class I waste injection well.

Response: The Ashtabula well has been blamed for several series of earthquakes in 1987, 1989, and 2001 based on their vicinity to the well, the general understanding that earth stresses are high, and the absence of previously reported earthquakes within a distance of 30 km, about 18 miles. Consideration of the injection well history suggests that there is no relation because the earthquakes occurred independently of changes in the injection rates which should have affected the hydraulic pressure within fractures. Injection began in 1986. Because of decreasing injection rate, pressures declined after 1990. Injection ended in 1994. Earthquakes were recorded in 1989, 1990, 1992, 2001, and 2002. Since 1987, a number of earthquakes have been located from 10 to 30 km from the site of the well. No one has attempted to link these events to the injection well, and their occurrence argues that seismicity in the area is natural.

The series of earthquakes in 2001 occurred along a more distant fracture several years after the pressures in the area peaked. Although the pressure at the location was still elevated, it was less than 20%, probably much less, as high as the pressure which existed at the location of the first series of earthquakes in 1987. Theoretically, the pressure required to induce earthquakes on parallel fractures should be equivalent (Nicholson, 1990).[8] Although injection can trigger earthquakes, it is not at all certain that injection triggered the earthquakes near Ashtabula. Analysis of pressure decline during times when the well was not operating allows a prediction of pressure decline in the reservoir. That prediction indicates that the pressure at the well bore was less than 50 psi higher in 2001 than it was before injection began. The pressure at a distance of five kilometers would be considerably lower. These earthquakes occurred almost seven years after the well was plugged and five years after the pressure at the focus of the main earthquake peaked and began to decline.

Injection, including injection into the Mt. Simon near Romulus, has been widespread throughout the northeast for many years, but very few earthquakes have been triggered.

3. Comment: The Ashtabula well injected wastes into the Mt. Simon Sandstone, just as the EDS wells would. How can we be sure that there are not faults in the zone of influence?

Response: The pattern of seismicity suggests that the Ashtabula area near the eastern end of Lake Erie had many fractures while there have been few earthquakes at the western end of Lake Erie. In addition, the Mt. Simon in eastern Ohio

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[8]Nicholson, C., and Wesson, R. L, 1990. Earthquake Hazard Associated with Deep Well Injection – A Report to the U.S. Environmental Protection Agency: U.S. Geological Survey Bulletin 1951, 74 p.

becomes thin, and has lower porosity and less permeability than does the Mt. Simon beneath southeastern Michigan. These are important indicators that injection-induced seismicity is unlikely because high injection pressures are dissipated more quickly where the injection zone is thicker and has better reservoir qualities. EPA made a careful search for faults in the injection zone and no faults were found. As noted above, there is strong evidence that the well in Ashtabula was not responsible for the seismicity there.

4. **Comment:** If the wells cause an earthquake or contaminate drinking water, the damage cannot be undone or controlled.

Response: It is unlikely that earthquakes will be triggered. The EDS site is located in an area with low risk for seismic activity. Injection-induced earthquakes cease as soon as the pressure declines below a critical level. Therefore, if the EDS wells were to induce earthquakes, they could be stopped simply by stopping injection. Because the Mt. Simon in this area is porous and permeable, the pressure drop would occur in just a few days. In regard to ground water contamination, the LDR prohibit the injection of hazardous waste unless a petitioner demonstrates to EPA that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. The no migration demonstration shows that there will be little upward migration of hazardous materials if there are no conduits for flow. There are many layers of rock in the salt-bearing formation between the injection zone and the USDWs which deform to fill all voids under pressure. Any conduit which is not artificially protected from closure in such a zone will be closed by this deformation. This makes the potential for any conduit to reach within 600 feet of the USDW exceedingly small.

5. **Comment:** The idea of modeling waste for 10,000 years is absurd on its face. We have earthquakes here. An injection well in Ashtabula, Ohio, caused earthquakes, the most recent one in 2001. That earthquake was felt here. Ashtabula isn't far away and the zone which will be used for injection is the same one used at Ashtabula.

Response: Earthquakes of the sort which have affected Ashtabula will have little or no effect on the movement of the waste within the injection zone. Analysis of information from the portable seismic equipment installed for periods during which earthquake activity occurred in 1987 and 2001 shows that the earth movements occurred only below the injection zone. We do not know if the fractures reach the injection zone at all. Tests of the wells show that radial flow, unaffected by fracture flow, appears to persist for hundreds of feet from the Ashtabula well. Ashtabula is 200 miles from Romulus, and the quality and thickness of the Mt. Simon is much better in the Romulus

area than near Ashtabula. These factors will result in much lower increases in injection pressure at Romulus.

6. Comment: Science did not protect the people of Winona, Texas. American Ecology, formerly known as Gibraltar, facility at Winona was closed down after over 600 lawsuits were filed, mostly by the parents of children who were born deformed or were affected by the drinking water afterwards. The impact of this now closed facility has and shall continue to wreak havoc upon the health and welfare of the people of Winona. These include occurrences of childhood cancers, adult cancers, birth defects in both humans and livestock that have risen alarmingly.

Response: EDS has demonstrated that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. Based on EDS's demonstration under 40 CFR Part 148 subpart C, EPA has found EDS's proposed injection protective of human health and the environment.

The ground water contamination at the Winona, Texas, injection well facility was not a result of upward migration of injected waste. An expansion joint was improperly installed in the sump of the above-ground drum handling building which allowed contaminants from spills to seep into the ground. After this error was identified, this sump was reconstructed so that there was no gap for fluids to seep through. Ground water remediation was started and the contaminated waste stream has not left the facility. EPA Region 6 has obtained no information that injected wastes have migrated from the injection zone.

No links have been established between any pollution from the American Ecology facility at Winona and any health problems.

7. Comment: Mr. William Sanjour who had been Director of the Office of Solid Waste & Emergency Response wrote, "EPA has bent over backwards to allow the hazardous waste facility [American Ecology in Winona, TX] with its terrible record of pollution and violations to continue an operation and may even have gone so far as to reduce the standards for protection of human health and environment to allow the facility to expand its operations."

Response: As a preliminary clarification, please note that Mr. Sanjour worked for the Ombudsman, which used to be part of the Office of Solid Waste and Emergency Response; but was not the Director of the Office of Solid Waste and Emergency Response. As has been explained previously, the release at Winona was not caused by the operation of the injection wells. There is no evidence to indicate that the Class I hazardous waste injection wells have had any detrimental effect on human health and the environment. The shallow ground water contamination identified at the Winona, Texas

facility came from surface operations, not the injection wells. Ground water remediation involving a recovery trench system has prevented migration of contaminated ground water off site. Therefore, the contaminated ground water has had no impact on human health or the environment.

8. Comment: Toxic releases have become commonplace at Vickery, Ohio. Clouds of toxic gases inundate the town and contaminated ground water feeds streams. What can happen in Vickery can happen in Romulus.

Response: Releases at Vickery were not caused by underground injection. There were three releases of nitrous oxide to the atmosphere during above-ground waste blending over a course of two years. The facility's operator reported the releases to Ohio EPA and Vickery Environmental has stopped accepting wastes from the source responsible for the nitrous oxide. An occurrence of this type of release is less likely to occur at the new EDS facility because the modern design includes enclosed transfers from transporters to the surface facilities. A system is in place to prevent the escape of gases from the building. Storage of hazardous waste at EDS prior to disposal by injection is regulated under Michigan Part 111 rules authorized under RCRA. These rules address specific requirements concerning general facility standards, preparedness and prevention, waste storage vessels, recordkeeping, corrective action, emergency procedures, and contingency plans. EDS has applied for an operating license from the State under these rules and RCRA. While EDS's surface activities will be regulated and require an operating license from the State, EPA notes that its determination on EDS's petition for an exemption from the LDR for deep underground injection under 40 CFR Part 148 focuses mainly on subsurface activities, structures and conditions.

9. Comment: There is a report from the Ontario Ministry of the Environment from about 20 years ago which discusses contamination which occurred through the Detroit River Formation. The commentor suggested that we contact the Ministry for more information.

Response: EPA reviewers looked for information on the internet and found a substantial amount of discussion about surface contamination of the Detroit River Formation which is at the surface in the Sarnia area. Some studies confirmed that the source of the contamination was at the surface. (See generally Raven, K.G.; Lafleur, D.W.; Sweezey, R.A. "Monitoring Well into Abandoned Deep-Well Disposal Formations at Sarnia, Ontario." Canadian Geotechnical Journal Vol. 27, No. 1, p 105-118, February 1990.)

10. Comment: A deep injection well in Scio Township (Gelman Sciences) was used to inject ground water contaminated with dioxane. Now dioxane has been found in the deepest fresh water aquifer.

Response: The deepest report of dioxane is from Unit E of the glacial drift, which is less than 400 feet deep. The aquifers in the glacial drift are recharged by rain water soaking through the soil. Because Gelman Sciences used unlined pits for storage and spread the wastes on the ground, it is more likely that the dioxane seeped downward through a few hundred feet of soil or possibly abandoned, unplugged water wells from the surface rather than upward through over 4,000 feet of rock having very low permeability. The base of the USDWs is at the base of the Detroit River Group which is at a depth of about 1,600 feet at Ann Arbor. Dioxane contamination has not been reported from the deeper bedrock aquifers. Therefore, it appears that the contamination came from the surface.

11. Comment: We know from the clean up of a plume of contamination from the Gelman Sciences facility in Ann Arbor and Scio townships that we can't really know what happens to toxic chemicals underground.

Response: The situation at EDS is different from that arising at the Gelman Sciences facility. At Gelman Sciences, waste was stored in unlined lagoons and spread on the ground for disposal. Therefore, it was predictable that the waste would migrate into the shallow ground water. At EDS, wastes will be stored in steel tanks within secondary containment regulated under RCRA.

12. Comment: No one knows if the deep injection well at Gelman Sciences spread more dioxane into the ground water, but some residents speculate that its casing might have leaked.

Response: The condition of the casing which carried the wastes to the injection zone was monitored continuously during injection and was tested regularly. No wastes leaked through the well's casings. Because the contamination came from surface lagoons, this example has no bearing on the EDS deep injection wells.

13. Comment: Deep well injection has been used to dispose of municipal wastes in Florida for some time. Now fresh water has recently been found to be flowing around coral reefs offshore. People there believe that the injection of wastes has forced the fresh water out of the formations where the resistance to flow is lowest. These (Florida) wastes were supposed to be contained for 300 years.

Response: The wastes disposed of through Class I wells in Florida were injected into relatively shallow aquifers which are not overlain by strata having low permeability. The injection zones discharge to the ocean within a relatively short distance from the injection wells. The EDS wells inject into very

deep aquifers separated from the USDWs by over 3,000 feet of rock, most of which has very low permeabilities.

14. Comment: The same failed science that was used at Winona, Texas, and Vickery, Ohio, is poised to betray the citizens of Romulus and Southeast Michigan.

Response: EPA disagrees that underground injection is a failed science. Since the implementation of the federal UIC program, there have been no confirmed cases of fresh water aquifer contamination due to hazardous waste injection through a properly operated Class I well. This includes the wells associated with the injection facilities at Winona, Texas, and Vickery, Ohio.

XVII. Concerns About Well Construction

1. Comment: The Michigan rules state that "all avenues for entry of pollutants into fresh water from surface sources must be closed." Therefore, the well is forbidden.

Response: The review of the well construction determined that all casings are properly installed and concluded that there will be no pollution of USDWs as a result of waters flowing along the well bore from the surface. EPA's technical review confirmed that the construction of the wells meets EPA requirements found in 40 CFR § 146.65. Among other things, this regulation requires Class I hazardous waste injection wells to be constructed and completed to prevent the movement of fluids into or between USDWs or into any unauthorized zones. Furthermore, granting of the exemption from the LDR does not exempt the wells from other requirements and/or approvals. The State of Michigan also issued permits for construction of the EDS wells.

2. Comment: One commentor referred to a Michigan rule for the types of lost circulation material which can be used during the drilling and setting of conductor and surface casing and used the rule to argue that buffered chemicals which may be toxic would be used between batches of toxic waste and that these might escape the encasement and are prohibited for use in Michigan.

Response: Restrictions on materials used for lost circulation would not apply once the construction of the well is completed and there is no possibility for lost circulation. Such a restriction prevents the loss of toxic materials into USDWs during the drilling of the wells through USDWs but does not apply to waste disposal.

3. Comment: Figure 1 in the Notice of Intent indicates that the banned rock salt layers have been penetrated before setting of the surface casing, and have thus violated the prohibition. The casings provided around the drilled well are

inadequate according to local practice and generally accepted safety rules, scientific evidence, and common sense. EPA assumes that the entire landmass of the United States is made up of the same material and ."...will never change - at least for 10,000 years." This is a denial of all basic laws.

Response: The rule referred to governs the installation of surface casing through the portion of the well bore penetrating USDWs. It prevents the solution of rock salt and subsequent contamination of USDWs resulting from loss of salt-contaminated drilling fluid. During construction of the wells, surface casings were installed at depths of 396 and 596 feet, respectively, in wells #1-12, and #2-12. Intermediate casings were set at 824 and 1,450 feet, respectively, in wells #1-12 and #2-12. Thus, Well #1-12 has two casings set between the base of the USDW and the salt. Well #2-12 has one string of casing set between the base of the USDWs and the salt and a second casing set within the salt bearing Salina Formation. These intermediate casings extend over one hundred feet below the deepest possible USDWs which are less than 400 feet from the surface and are above the uppermost salt layer. These casings provide protection of the USDW against any contamination from salt layer dissolution and salt-contaminated drilling fluid. Additionally, EPA notes that the EDS wells satisfied all EPA UIC regulatory construction requirements for Class I hazardous waste injection wells required in 40 CFR § 146.65.

EPA has not assumed that the entire landmass of the United States is made of the same material. As set forth in the demonstration, the geologic model includes layers of rocks with varying properties which extend beyond the region which will be affected by EDS's proposed injection. Changes outside this area do not affect the demonstration. No changes in this geology were assumed because 10,000 years is a relatively short amount of geologic time.

4. Comment: The conductor casing is cemented in such a way that there was insufficient drying time which will result in friability and an unacceptable level of porosity for use. The manner in which the cement was mixed and put in place was inadequate. The conductor casing at the surface is inadequate and will not perform at the presumed level of performance.

Response: The conductor casing is installed to prevent enlargement of the hole due to erosion of unconsolidated material during the initial stages of drilling the injection well. The conductor casing was set at 119 feet in WDW #1-12 and at 177 feet in WDW #2-12. After drilling through the lowermost USDW, surface casing is set and cemented to surface. The surface casing, not the conductor casing, provides the protection of the USDW. During the no migration petition technical review process, EPA evaluated the drilling and completion reports for both injection wells and determined they were properly constructed and cemented. Additionally, EPA notes that the EDS

wells satisfied all the UIC construction requirements for Class I hazardous waste injection wells in 40 CFR § 146.65.

5. Comment: The surface casing has been set with an unproven type of cement purchased from a manufacturer unfamiliar with the use it is being put to.

Response: During the no migration petition technical review process, EPA evaluated the surface casing strings of the EDS injection wells and determined that they were constructed and cemented to be protective of all USDWs. The cement utilized in well construction was specifically designated for surface casing applications and was pumped in place by a recognized well service firm. Additionally, EPA notes that the EDS wells satisfied all EPA UIC construction requirements for Class I hazardous waste injection wells in 40 CFR § 146.65. Among other things, those standards require Class I hazardous waste injection wells to be constructed and completed to prevent the movement of fluid into or between USDWs or into any unauthorized zones.

6. Comment: Item F of Special Order No. 2-73, amended, (2) requires surface casing to be run at least 100 feet below fresh water aquifers and to be cemented to the surface. When cement does not return to the surface because of "losing returns," an exception to the requirement must be requested specifying the measures proposed to deal with the situation.

Response: Based on EPA's review, the EDS injection wells satisfied the EPA UIC construction requirements for Class I hazardous waste injection wells contained in 40 CFR § 146.65. Specifically, properly constructed injection wells provide multiple levels of protection. For each well, EDS requested and was granted permission by EPA to grout the upper section from the surface because of lost circulation.

7. Comment: The intermediate casing has been constructed in a short time without the supervision of experienced engineers.

Response: During the no migration petition technical review process, EPA reviewed the EDS well drilling reports and determined that the intermediate casing was constructed and cemented under the supervision of experienced engineers. Additionally, EPA notes that the EDS wells satisfied all the EPA UIC construction requirements for Class I hazardous waste injection wells in 40 CFR § 146.65.

8. Comment: Are there any problems with the casings of the wells of which EPA is aware?

Response: No. The construction of the EDS wells satisfied all the EPA UIC construction requirements for Class I hazardous waste injection wells in 40

CFR § 146.65. Casing inspection logs confirm that there is no damage beyond surface scratches and indentations typical of casing installation.

9. Comment: The protection casing is inadequate beginning at approximately 250 feet and proceeding with continued lack of quality to the containment zone.

Response: EPA disagrees. As determined by EPA review, the protection casing strings in both EDS wells satisfied the EPA UIC construction requirements for Class I hazardous waste injection wells in 40 CFR §146.65. The drilling and completion reports included in the no migration demonstration provided the details of the size, type, and weight of the protection casing used in each well. The technical review by EPA staff included the evaluation of the electromagnetic casing inspection logs for both wells and determined that both protection casing strings were in good condition after installation.

For the no migration demonstration, EDS provided MIT and annulus pressure test results dated April 4, 2003 for WDW #1-12 and WDW #2-12 as required in 40 CFR § 148.20(a)(2)(iv). These test results indicate that the wells have mechanical integrity and are constructed to prevent migration of waste from the injection zone.

10. Comment: The injection interval is purported to be the Mount Simon sandstone. Figure 1 clearly displays the termination point of the injection well in the Franconia layer. Waste must traverse 70' of the Franconia and Eau Claire formations before arriving at the injection interval. This is a design flaw that must be corrected. The casing cannot be extended, a new well would have to be drilled.

Response: Figure 1 is in agreement with the injection interval description in the petition. The injection interval portion of the injection zone as stated in the Notice of Intent published in the Federal Register (67 Fed. Reg. 77981, December 20, 2002): "The Mt. Simon, Eau Claire, and Franconia-Dresbach Formations at depths from 3,937 to 4,550 feet below the surface will actually contain the injection wastes." Additionally, the proposed decision included specific conditions for granting an exemption [67 Fed. Reg. 77991, (12/20/02)]. Specifically, condition No. 2 states, "Injection shall occur only into that part of the Franconia-Dresbach, Eau Claire, Mt. Simon, and Precambrian Formations which is more than 3,900 feet below the surface and less than 4,550 feet, true vertical depths, below the surface." The EDS no migration demonstration incorporated all three of the requested injection interval formations.

11. Comment: Construction of wells for disposal is dangerous and unsound, and results will be environmentally damaging.

Response: EPA disagrees. EPA has determined that injection wells can be protective of human health and the environment. RCRA allows for disposal of restricted wastes into deep wells if standards are met. EPA notes that in meeting the no migration standard and the other requirements of 40 CFR Part 148 subpart C, the EDS wells also satisfied the hazardous waste injection well construction requirements of 40 CFR §146.65 and the monitoring and testing requirements of 40 CFR § 146.68. Additionally, EPA notes that UIC regulations in 40 CFR Part 146 for Class I hazardous waste injection wells provide additional injection well monitoring and construction safeguards.

12. Comment: The corrosion-inhibited brine water to be used as the annulus fluid will be made corrosion inhibited by non-organic chemicals, and is therefore outlawed for this use in the State of Michigan.

Response: The corrosion inhibitor is sold by Baker Petrolite under the name CRW132 Corrosion Inhibitor. This oxygen scavenger is regularly used in Michigan. The primary oxygen scavenging agent is ammonium bisulfite, which is considered an organic compound although it is not a carbon compound. EPA notes that the composition of the annulus fluid is not a consideration in the land ban decision process as described in 40 CFR Part 148 or in the UIC regulations for construction of injection wells in 40 CFR Part 146.

XVIII. Waste Disposal Operations

1. Comment: What companies will send waste to the injection well?

Response: At this time, no sources have been approved for injection. When EDS is fully authorized to operate, it must submit source information and be granted approval by EPA for each source in accordance with the UIC permit requirements before the waste can be injected. When sources are approved, that information will be available to the public. In reviewing EDS's petition, EPA considered the nature of the waste streams that EDS could be authorized to inject.

2. Comment: Which companies will transport wastes to the injection wells?

Response: As discussed above, when EDS is fully authorized to operate, it must submit source information and be granted approval by EPA for each source in accordance with the UIC permit requirements before the waste can be injected. The transportation used to deliver the waste from such sources to the site, however, would be regulated by other requirements, such as Department of Transportation and Michigan regulations.

3. Comment: Air pollution will come from the building where the wastes are stored before injection.

Response: The waste will be contained in closed tanks within the building. Drummed waste will be pumped, not poured, out of the drums and sent to a temporary storage tank under a nitrogen blanket. The building has a filtering system which is designed to prevent escape of pollution. EDS will conduct ambient air monitoring around the facility to demonstrate that it is emission free. EDS must obtain a license from MDEQ for operation of its hazardous waste treatment, storage, and disposal facility under Michigan's authorized RCRA requirements and must comply with those State RCRA requirements, including air monitoring requirements.

4. Comment: At the last meeting, EPA said that EDS could inject any wastes with RCRA codes, but now it tells us that wastes will be restricted.

Response: The LDR EDS is seeking an exemption from only prohibit land disposal of "restricted" categories of hazardous waste. There are wastes not covered by these restrictions that could be injected without an exemption, provided other applicable requirements are met. The UIC permits issued to EDS would allow injection of non-hazardous waste and non-restricted hazardous waste if EDS had other permits from the State. Hazardous waste subject to the LDR are identified at 40 CFR Parts 148 and 268.

With the exemption, EDS will be allowed to inject certain wastes which are subject to the LDR, as well as non-restricted hazardous wastes and non-hazardous wastes, provided EDS obtains other required permits and/or licenses. EDS will not be allowed to inject wastes which are managed under other laws, such as the Toxic Substance Control Act (TSCA) and Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). EDS will not inject wastes which are radioactive or infectious. Although the draft exemption determination proposed to allow the injection of RCRA codes D001 (ignitable) and D003 (reactive) wastes, EDS's UIC permits prohibit EDS from injecting such wastes. Accordingly, these waste codes have been deleted from the list of approved codes in the exemption, for consistency with the permits.

5. Comment: Will the acidic or basic wastes be neutralized before injection?

Response: Not necessarily. Both acidic and basic wastes are commonly injected into deep injection wells. The sandstone injection interval and overlying containment interval are compatible with most strong acids and bases. The rocks will not lose their mechanical strength. EDS demonstrated that the hydrogeological and geochemical conditions at the site and the physiochemical nature of the waste streams are such that reliable predictions can be made that fluid movement conditions are such that the

injected fluids will not migrate within 10,000 years vertically upward out of the injection zone; or laterally within the injection zone to a point of discharge or interface with a USDW.

6. Comment: All liquid waste was to be solidified or neutralized prior to injection.

Response: RCRA provided for the prohibition of land disposal of hazardous wastes by a number of methods of land disposal, among them deep well underground injection. However, RCRA also provides for exceptions from these prohibitions. A no migration exemption is an exception allowing land disposal of hazardous waste to continue provided the disposal is protective of human health and the environment for as long as the waste remains hazardous (See RCRA Section 3004(d)(1), (e)(1), (f)(2) and (g)(5), 42 U.S.C. § 6924, (d)(1), (e)(1), (f)(2) and (g)(5)). The regulations at 40 CFR Part 148, promulgated under RCRA §3004(f) and (g), implement the requirements for an exemption for deep well injection of restricted wastes. EDS submitted a petition making a showing, under 40 CFR § 148.20(a)(1), that the hydrogeological and geochemical conditions at the site and the physiochemical nature of the waste streams are such that reliable predictions can be made that fluid movement conditions are such that the injected fluids will not migrate within 10,000 years: (A) vertically upward out of the injection zone; or (B) laterally within the injection zone to a point of discharge or interface with a USDW. This provision does not require EDS to solidify or neutralize the waste prior to injection.

As part of its no migration demonstration, EDS addressed the issue of waste compatibility with both the formation fluid and injection zone. Solidifying the waste prior to attempting to inject it would render injection of the waste infeasible.

7. Comment: Will heavy metals such as mercury, chromium, and nickel pose a threat after injection?

Response: No. The demonstration of no migration shows that even the most mobile molecules will not migrate more than 250 feet above the top of the injection interval which is more than 3,200 feet below the deepest USDW. Because none of the injected wastes will be able to reach drinking water supplies, there is no need to further restrict the wastes which are injected. Because these materials are heavy, they will travel considerably less distance than will the lighter, more mobile waste constituents. EDS submitted waste compatibility studies in Section VI.A.3 of the no migration demonstration that satisfied the requirements of 40 CFR §§148.20, 148.21 and 148.22(a). In addition, the no migration demonstration addressed the vertical and horizontal containment of all potential wastes identified. Based on EPA's technical review, EDS met the requirements of 40 CFR Part 148 and demonstrated that there would be no migration of hazardous constituents,

inclusive of any heavy metals, from the injection zone for as long as the waste remains hazardous. Based on EDS's demonstration, EPA has determined that the proposed injection will be protective of human health and the environment.

8. Comment: Some wastes which are highly corrosive or reactive should not be mixed or, if injected, should have large time intervals between disposal.

Response: EDS requested exemption for waste codes that included both corrosive and reactive type wastes. The UIC permit prohibits EDS from injecting reactive wastes. Accordingly, the issued exemption does not allow injection of reactive wastes. The no migration demonstration, provided by EDS, addressed the issue of waste compatibility with the reservoir fluid and the rocks of the injection zone as well as the containment of such wastes. The demonstration also addressed well construction and waste compatibility with well materials. EDS plans to inject chemicals which would react if mixed, such as acids and bases, through separate wells.

9. Comment: EDS should provide clear data sheets on what it intends to inject.

Response: The UIC regulations do not require the operator of a Class I hazardous waste injection well to provide Material Safety Data Sheets. EDS's petition sought to inject listed or hazardous wastes identified under 40 CFR Part 261, subparts C and D. Because each waste code contained in Part 261 identifies a specific waste with specific chemical and physical properties, EPA already has extensive data on the chemical and physical properties of listed and characteristic wastes. When wastes are presented to EDS for disposal, EDS will provide information about the source and chemistry of the waste to EPA's UIC Branch. Please note that information on chemicals listed in 40 CFR Part 261, among other chemicals, are publicly available. e.g. See http://yosemite.epa.gov/oswer/ceppoweb.nsf/content/chemicalinfo.htm

10. Comment: EDS has to store the waste prior to injecting it. What if there is an explosion? What is going to happen?

Response: Storage of hazardous waste at EDS prior to disposal by injection is regulated under Michigan's authorized RCRA hazardous waste program. These RCRA requirements include general facility standards, preparedness and prevention, waste storage vessels, record keeping, emergency procedures, and contingency plans. Both the EPA SDWA UIC permit and the MDEQ Part 111 construction permit for the surface facility restrict EDS from accepting ignitable and reactive wastes. EDS is also seeking a hazardous waste treatment, storage, and disposal facility operating license from MDEQ. With respect to the petition for an exemption from the LDR, surface explosions in the vicinity of the wells should not impact the wells

or the proposed injection because the extent of fracturing caused by an explosion at the surface is limited to a few feet of the surface.

11. Comment: The discussion in the Notice of Intent regarding the injection of buffers stated that "EDS will inject fresh water to serve as a buffer between the formation water and the injectate before it begins to inject wastes and between injecting each batch of waste." This language should not be made a requirement of the final petition exemption to allow EDS to inject whatever buffer it believes is most appropriate. Injection of a fresh water buffer may be unnecessary and could potentially damage the formation. The final exemption order should not include terms specifying buffer frequency or composition.

Response: The type and amount of buffer fluid used by EDS is relevant to the no migration demonstration only in terms of the limitation on the injection rate. EDS demonstrated the compatibility of the proposed injected wastes with the well's construction, formation fluid, and rocks of the injection interval. Depending on the type of waste injected, buffer fluid may or may not be beneficial to prevent the buildup of precipitants in the injection interval. EDS has demonstrated it is aware of potential compatibility problems by drilling two wells to allow separation of wastes which would react so as to prevent injectivity problems attributable to the plugging of the injection interval.

12. Comment: Buffers injected between batches of chemicals will cause additional dispersion including dispersion into bodies of rock which are proposed to block their flow by buoying them up relative to the original brine contained in the formations.

Response: Batches of injectate may have some dissimilarities and these dissimilarities will result in additional dispersion. This dispersion will not extend beyond the injection zone because the injection interval is much more permeable than the confining layers. Although mixing may not be immediate or complete, it will occur through both mechanical action and diffusion where flow is very slow. Eventually, by continuous mixing, the plume will become very dilute at its outer edges. Because all injected wastes, even low concentrations of organic wastes, will be soluble in water, there will be a single liquid phase in the injection zone and any tendencies to buoyant motion will be attenuated due to dilution. The effects of buoyancy were included in EDS's demonstration of no migration.

13. Comment: The wastes injected will mix despite the alternation of the injection of wastes and brine.

Response: There is no UIC requirement to separate the wastes from native brine or each other. The use of buffers is proposed by the operator to optimize

injectivity. EDS has demonstrated it is aware of potential compatibility problems by drilling two wells to allow separation of wastes which would react so as to prevent injectivity problems attributable to the plugging of the injection interval.

14. Comment: What would be the environmental consequences of a mixing of the waste injected by EDS with those injected by SPMT?

Response: There would be no environmental problems. SPMT proposes to inject saturated sodium chloride brine. The usual reaction due to the mixing of liquids containing inorganic ions is the precipitation of salts. The brine to be injected by SPMT will contain a less diverse group of ions than contained in the brine which resides in the Mt. Simon so there is less chance of reaction with the waste injected by EDS than with the natural brine.

15. Comment: What remaining steps must be taken before EDS can begin operations? EPA should clarify in detail the process EDS must still complete before any hazardous waste is injected through the Romulus wells and provide a timeline for this process.

Response: After receiving the land disposal restriction exemption, EDS still needs a RCRA hazardous waste treatment, storage, and disposal facility operating license from MDEQ and a modification to the federal UIC permits to begin operations. EDS has applied for a State RCRA operating license and for the renewal of its UIC permit.

16. Comment: Provide a detailed description of the tests EPA will be conducting in Romulus, and the timeline of when each step in this process will be completed.

Response: All of the testing required to support the demonstration of no migration has been completed. EDS is responsible for performing and maintaining well monitoring activities and conducting any required testing. EPA inspects site records to verify EDS compliance with the monitoring and testing requirements. EPA also reviews all reports and tests submitted to the Agency and may witness testing at the facility. Annual testing requirements are detailed in 40 CFR § 146.68 and in the UIC permit. Specifically, EDS is required annually to demonstrate mechanical integrity, test the cement seal of each well and, at five-year intervals, test for movement of fluid along each injection well's outside casing. The UIC permit also requires EDS to conduct annual reservoir pressure tests. Casing inspection logs must also be run when the operator conducts a workover in which the tubing has been pulled from the well, unless a log has been run within the previous five years. EDS will also continuously monitor annulus and tubing pressures and injection rates; maintain records of the monitoring

data; and be subject to review of monitoring records by EPA inspectors. Reporting requirements for EDS are detailed in 40 CFR § 146.68 and Attachment A of the permits. EDS will provide EPA with monthly reports listing the waste components by common and chemical names with their structures and concentrations, daily measurements of maximum injection pressure, maximum and minimum sight glass levels, maximum and minimum annulus pressures, minimum differential pressures between simultaneous measurements of injection pressure and annulus pressure, total volume injected, and any noncompliance with permit conditions. The monthly report must include a total of the volume injected for the month and through the life of the well as well as the amounts of liquid added to or removed from the annulus system along with the dates of the additions or subtractions and cumulative additions and subtractions for each of the previous 12 months and for the 12-month period as a whole. Quarterly, the operator must report results of required fluid analyses.

17. Comment: Item F of Special Order No. 2-73 amended, (5) discusses the type of fluids that can be used for drilling and setting conductor and surface casings. EPA told attendees at the January 8, 2003, meeting that buffered chemicals would be used when toxic wastes were injected. It was inferred that the buffered chemicals would be replaced as each different type of waste was injected and the materials used to buffer the toxic waste are apparently toxic themselves and therefore prohibited by Michigan should they escape the encasement.

Response: Limitations on the use of materials for one activity do not limit the use of materials for an entirely different purpose. The fluids used to drill the well to a specific depth prior to setting the conductor and surface casings are different than the wastes proposed for injection. In drilling the well, the liquids would be circulated through an open well bore and some would escape from the well and migrate into any aquifers penetrated by the well. During injection, the liquids would be injected into a deep aquifer which is approved for the disposal of hazardous wastes. Moreover, EDS has no plans to inject buffered chemicals.

EPA did not tell the public that buffered chemicals would be used. Speakers said that fresh water or brine buffers might be injected between batches of wastes. The type and amount of buffer fluid, as such, included as part of the EDS waste stream are not relevant to the no migration demonstration because it used very general characteristics and remains valid within the limits considered. Any buffers which are used are likely to be either fresh water or sodium chloride brine which are not prohibited from injection under Michigan law. EPA also notes that UIC regulations in 40 CFR Part 146 for Class I injection wells provide for additional injection well monitoring and construction safeguards to prevent leakage from the injection zone.

18. Comment: The placement of twin wells is fundamentally unsound in principle or practice. The operation of one well will impair the operation of the non-functioning well. Early aging will occur and, coupled with the inadequate design and construction of the wells, one or both will have the possibility of failure during operation somewhere within the well bore.

Response: EPA disagrees that operation of two injection wells at the same facility is unsound in principle or practice. Multiple injection wells into the same injection zone at the same facility are common in the United States and provide for operational flexibility. EPA also disagrees that the operation of one well would impair the function of the second well if it were inactive. In projecting pressure buildup effects in the no migration petition, waste injection from both wells simultaneously into the same injection interval was accounted for in the demonstration modeling. EPA reviewed in detail, inclusive of injection from both EDS wells, the no migration petition and concluded EDS has met the standards of 40 CFR Part 148 subpart C.

EPA disagrees that the wells were inadequately designed and constructed and will age early. Based on a detailed technical review of the no migration petition, EPA determined that the EDS wells satisfied all the EPA UIC construction requirements for Class I hazardous waste injection wells in 40 CFR § 146.65. Both wells were designed and constructed to be protective of human health and the environment and prevent migration of waste out of the injection zone. EPA's UIC regulations provide additional safeguards against the potential for well failures. The UIC regulations include well construction requirements and such activities as annual mechanical integrity testing and continuous monitoring of annulus and of tubing pressures. The continuous monitoring requirements remain in place whether or not a well is active. Therefore, if one well injects while the second is not operating, the standards in 40 CFR Part 148 subpart C are still met.

19. Comment: We believe that there should be safeguards to prevent wastes from being pushed into the second well which may be idle. An annual radioactive tracer survey and a five-year temperature log do not seem sufficient.

Response: Because wells are closed in at the surface when not operating and no liquid can enter from the bottom of the well bore, wastes will not be pushed into the second well. As required by the federal regulations in accordance with 40 CFR § 146.68, the EDS UIC permit issued by EPA requires continuous monitoring of the injection rate and injection pressure. In addition, the tubing - casing annulus must maintain a positive pressure differential over the injection tubing pressure and this annulus pressure must be continuously monitored. The UIC permit also requires automatic alarms designed to sound before pressures, flow rates, or other parameters exceed permitted values. The continuous monitoring of the injection wells occurs

whether or not the well is operating. EDS is currently in compliance with all applicable regulations of the UIC program.

Documentation showing that both injection wells met MIT requirements was submitted with the EDS petition that satisfied the requirements of 40 CFR § 148.20(a)(2)(iv). The no migration petition conditions and current EPA UIC regulations for Class I injection wells in 40 CFR Part 146 provide well monitoring and construction safeguards against the potential for well failures.

20. Comment: You say that EDS needs two wells in case the first one ruptures. That proves that they are dangerous.

Response: EDS decided to construct two wells for injection of wastes which might not be chemically compatible. It also allows them to inject when one well is being tested or serviced. The tests which EPA's regulations require necessitate shutting down each well for a period each year. In addition, the tubing through which the waste is injected is removable so it can be replaced periodically. During replacement, the well is inoperable. "Ruptures" can be detected when they are still very small because the pressure in the annulus will drop. The annulus fluid pressure is higher than the pressure in the injection tubing so that the annulus fluid flows into the tubing rather than the waste leaking into the annulus. The leaking tubing can be replaced safely. The wells are not dangerous.

21. Comment: EPA should require testing of all incoming waste streams for constituents which are hazardous at less than one part per trillion prior to acceptance and injection.

Response: EPA disagrees. The waste analysis plan which is included in the UIC permits requires complete analysis prior to injection and periodically thereafter. Some loads of approved wastes will be accepted after analyses which include only enough tests to confirm that the wastes are the same as those previously approved. The petition demonstrates that there will be no migration out of the injection zone within the very conservative limits of the modeling. Therefore, the frequency of analyses does not affect the validity of the exemption.

22. Comment: Who is responsible for matching the laboratory samples prior to transportation to the samples from the tankers prior to above ground storage and before the injection occurs.

Response: Both the generator and the treatment, storage, and disposal facility have responsibilities for waste identification under the RCRA hazardous waste regulations. Among other things, a generator must determine if the waste is a hazardous waste under 40 CFR Part 262. Before an owner or operator of

a treatment, storage, and disposal facility treats, stores or disposes of any hazardous waste, he must obtain a detailed chemical and physical analysis of a representative sample of wastes under 40 CFR § 264.13, among other things. Moreover, an off-site facility, among other things, must inspect and, if necessary, analyze each hazardous waste shipment received at the facility to determine whether it matches the identity of the waste specified on the accompanying manifest or shipping paper. The State of Michigan has been authorized for equivalent analogs to these requirements under RCRA Section 3006, and would issue the treatment, storage, and disposal facility licenses covering the Part 264 requirements in the State of Michigan. EDS has submitted an application to the State for an operating license. Under SDWA, UIC regulations and its permits, EDS is required to monitor the waste injected down a Class I hazardous waste well according to 40 CFR § 146.68. This includes following a waste analysis plan to obtain a detailed chemical and physical analysis of a representative sample of the waste. EDS is also required to satisfy the reporting requirements in 40 CFR § 146.69(a). EDS facility personnel will be responsible for these sampling and records management activities. Compliance with the UIC monitoring and reporting requirements is verified by EPA UIC compliance inspections and reviews of monthly reports.

23. Comment: There was a request for a sample of the waste and a list of all the chemicals that will be injected.

Response: Waste analysis was addressed in the no migration petition as required by 40 CFR §§ 148.21(a)(1) and 148.22(a)(2). EPA reviewed EDS's waste analysis plan as part of its technical review using 40 CFR Part 148 standards. A complete list of waste constituents contained in the requested waste codes was provided in Table VI.A.3(b)iv.c-1 of the EDS no migration petition in accordance with 40 CFR § 148.22(a)(1). The administrative record, including the listing of waste constituents, was available for review at EPA's Region 5 office during the public comment period. In addition to these, many chemicals not requiring an exemption from the LDR might also be injected. At this time, no sources have been approved. Therefore, EPA can not provide more specific information about what chemicals might be injected.

24. Comment: Vickery Environmental, Inc. (VEI) requests an explanation of why conditions which were imposed on their facility have not been imposed on the EDS facility. The VEI monitoring plan includes a deep monitoring well, a laboratory core testing plan to assess the impact of the injection of waste on the confining zone, and seismic reflection investigation.

Response: The seismic reflection surveys were required by Ohio regulations. The other conditions imposed on VEI were included in their exemption because of concern that releases of corrosive wastes prior to the approval of the

petition had compromised the integrity of the formations immediately overlying the Mt. Simon Sandstone at its facility. EPA reviewers questioned whether there was effective containment below the Knox Dolomite. The monitoring well has served as a continuing demonstration that there is effective containment. The core testing showed that, rather than causing confining zones to fail, flow of corrosive wastes through the confining zones actually reduced their permeability because of redeposition of dissolved minerals.

25. Comment: The petitioner commented that EPA misstated the method by which the injection rate should be calculated in the draft determination. The condition should have read:

> Average Injection Rate - The average injection rate through the life of the facility shall not exceed 166 gallons per minute.

The average injection rate shall be calculated at the end of each month by dividing the total lifetime volume injected to date at the end of the month by the nominal number of minutes since initiation of injection.

The nominal number of minutes in each month is:

365.25 days/12 months x 1440 minutes/ day = 43,830 minutes/month.

The condition for nominal monthly injection volume negates the meaning of the rate limitation and should be dropped.

Response: EPA agrees. The condition in the Notice of Intent states that:

> The volume of wastes injected in any month through both wells at the site must not exceed 7,275,780 gallons. This volume will be calculated each month.

This condition has been dropped and replaced with the following language:

> The volume of wastes injected through both wells at the site must not exceed an average of 166 gallons per minute. This average will be calculated at the end of each month based on the cumulative injected volume, the total number of months elapsed since initiation of injection through either well, and the number of minutes in an average month (30.44 days/month x 1,440 minutes/day).

Although the change was discussed, revisions to the petition immediately following the discussion did not include the change requested. When the petition was later revised to include this revision, EPA inadvertently omitted to note it and include the revision in the Notice of Intent.

The injection rate affects the modeling in that the rate multiplied by the length of the operational period determines the volume and consequently the size of the waste plume at the end of injection operations. The description of the injection period includes an average rate of 83 gallons per minute (gpm) rather than the full rate of 166 gpm because half of the entire injected volume is assumed to enter just 33 feet of the entire thickness of more than 600 feet which are open in the well bores. The value which is used in computing the plume migration is 20 years x 525,960 minutes per year times 83 gpm or 873,093,600 gallons.

The petition as revised meets the criteria in 40 CFR Part 148 subpart C.

The change in the method of calculating the average injection rate will also be included in the permits.

26. Comment: EPA should restrict the injection rate in the EDS permit to 100 gpm.

Response: EPA disagrees. As discussed in the Notice of Intent published in the Federal Register (67 Fed. Reg. 77981, December 20, 2002), the EDS no migration demonstration was based upon a continuous maximum injection rate of 166 gpm. EPA determined that EDS successfully met the demonstration standard of 40 CFR Part 148 subpart C with a maximum injection rate of 166 gpm through the life of the well.

27. Comment: The Michigan permit says that EDS can inject 400 gpm, not 100 gpm as EPA says.

Response: The EPA UIC permit will be modified to reflect the conditions under which the approved no migration demonstration was made. This demonstration was made using a rate of 166 gpm; therefore, the UIC permit will be modified to change the long term average rate limit to 166 from 170 gpm. Although its State permit might allow a greater rate of injection, EDS would still be limited by the more restrictive limit imposed in the exemption and its UIC permit. The 100 gpm value was used in an early version of the demonstration.

28. Comment: One commentor questioned the amount of injection that is permitted into the SPMT and EDS injection wells by EPA and MDEQ. Inconsistent injection values were reported at various meetings and hearings.

Response: Confusion may have been caused by the discussion of injection rates for both the SPMT and EDS injection wells at public hearings. Some comments attributed rates correct for the SPMT well to the EDS well. In addition, the early petition was based on a long-term average rate of 100 gpm, but the final petition was based on a rate of 166 gpm, with a maximum instantaneous rate of 270 gpm.

29. Comment: The waste is going to be injected at over 10,000 psi. Neither limestone nor sandstone will hold that kind of pressure. The waste will spread, find cracks and cause earthquakes, just like in Ohio.

Response: The EPA UIC permit currently limits the injection pressure to 521 psig at the surface. As discussed in the Notice of Intent, site-specific testing has demonstrated that a maximum injection pressure of 903 psig is safe, and the permit limit may be adjusted during the permit renewal process. Pressure in the injection zone is currently 1,984 psi at 4,265 feet. The injection pressure at this depth will be limited to 903 psig + 4,265 feet x 1.22 x 0.433 psi/ft, which is 3,156 psig. 1.22 is the maximum specific gravity permitted and 0.433 psi/ft is the pressure gradient for fresh water which has a specific gravity of 1.0. The term "psig" refers to pressure as read by a gauge which is calibrated to read "0.0" at standard atmospheric pressure.

30. Comment: EDS plans to inject at high pressures to create a bubble in the limestone and this bubble will allow waste to leak into the rock more quickly. This bubble constitutes a cavern which should be inspected and licensed by the U.S. Bureau of Mines.

Response: This is incorrect. EDS will inject at pressures appropriate for the depth. In order to create a bubble, the injection pressure would have to be sufficient to raise the rock overlying the injection zone. The downward pressure created by the weight of the overlying rock increases by just over one psi for each foot of depth. The injection pressure limitation is based on a pressure gradient of 0.746 psi/ft. Therefore, there will be no void space created. The waste will seep into pores within the Mt. Simon and Eau Claire formations without lifting the formations.

31. Comment: This permit, EPA 81H01003, does not list any injection pressure.

Response: The permits regulating the wells are EPA UIC permits #MI-163-1W-C007 and #MI-163-1W-C008. They set a pressure limit of 521 psig at the well head in Attachment A of the permit. Based on tests at the well, EDS has asked for an increase in this limit to 903 psig. Based upon current evidence, EPA might adjust the limit.

32. Comment: The operator has not described a monitoring system to ensure that waste does not migrate more than 2,000 feet from the injection point. What do they propose to do at the surface to monitor the activity 5,000 feet deep? If there is no geohazards survey including 3-D seismic, there are no assurances, only smoke and mirrors.

Response: EPA disagrees that there is no monitoring of injection well activity. Annual testing required under 40 CFR § 146.68 and conducted by EDS

includes a pressure falloff test which can be used to identify conditions in the injection zone which were not included in the model and simulation. At five-year intervals, temperatures along the well bore will be logged. By identifying water outside the casing which is not native to the formation in which it is found, upward migration from the injection zone can be detected. The temperatures of the injection zone currently range from about 85° F at the top of the injection zone to 93° F at its base. The temperature of the waste will probably average less than 70° F. The strata into which the waste migrates will be cooled by the waste. If migration occurs along the well bore, cooling of invaded zones will occur. This cooling is easily differentiated from conductive cooling which occurs as the waste passes through the well. If there are conduits at a distance from the well, then waste will pass through those conduits, and may permeate any porous zone through which the conduit passes. Therefore, the chances are good that any unexpected movement will reach the well bore outside the casing and a temperature effect would be identified at least by the time it reaches the White Niagaran porous zone at 2,100 feet. That zone is believed to be so porous and permeable that no pressure driven movement through it and upward would be possible.

33. Comment: No surface monitor system is proposed. Seismic activity induced as far as three miles from a 14,000 foot well in southwestern Colorado suggests that fractures outside the radius area of review of a Class I well might be affected.

Response: EPA notes that the Paradox Basin injection well referred to by the commentor, which is used to move salt water which would otherwise pollute the Colorado River from the near surface environment to a deep fracture system, was designed to intentionally operate above fracture pressure, resulting in fracturing of the injection interval. The fracture system is the reservoir in this case, and operating above the fracture system allows new reservoir to become accessible. Seismic surface monitoring is used in that project to monitor the growth of the induced fracture and the spread of the pressure within the system. As required by 40 CFR § 146.13(a)(1), the EDS Class I wells are permitted with an operating pressure limit below fracture pressure to avoid inducing fractures in the injection zone. The Colorado well, which is not a Class I well, is not subject to this regulation. As required by 40 CFR §146.63, the AOR for the EDS well is a circle 6.1 miles in diameter around the wells based on the cone of endangering influence rather than on the regulatory minimum of two miles.

34. Comment: There is no industry-State-EPA committee formed to establish guidelines to monitor the direction or distance the injected waste will migrate away from the injection well. This means that no credible basis exists for industry or

government agencies to provide any credible warranty or assurance about the safeguards.

Response: Hydrological modeling is a credible technology. Given the many layers of protection, the modeling submitted provides a credible demonstration of safety. EPA promulgated regulations in 1988 establishing criteria and procedures for no migration petitions, 40 CFR §§ 148.20-148.24. In the preamble to the final rule for hazardous waste disposal injection restrictions and requirements for Class I wells, EPA emphasized that conservative modeling can be used to bound the problem, therein forming the basis for a no migration demonstration. By bounding, the modeler essentially predicts what will not occur through the use of conservative data and assumptions. The preamble discussed the selection of a 10,000 year time frame and the use of models (See 53 Fed. Reg. 28117, at 28126 - 28127, July 26, 1988).

A similar modeling approach is used to bound pressure buildup effects in the petition. Review of the EDS petition was performed by EPA staff and consultants from LBNL and USGS with technical expertise to evaluate the petition and determine that the requirements of the no migration standard were satisfied.

35. Comment: EPA's 10,000 year no migration requirement does not appear to be supported by a 10,000 year management plan or by funding for post-closure monitoring of the movement of the plume. Post-closure requirements are also inadequate.

Response: EPA has carefully reviewed geological factors governing fluid movement in the subsurface. The demonstration of no migration used many conservative assumptions and will be checked through testing conducted during the life of the wells. Pursuant to 40 CFR § 146.71(d), before the wells are plugged, the pressure in the injection zone will be monitored to ensure that the pattern of pressure decline conforms to that predicted through extension of the simulation of pressure change through this monitoring period. The wells will be plugged by being completely filled with cement. As a result, after the wells are plugged, there will be no means to monitor the injection zone. EPA duly promulgated the requirements for hazardous waste injection wells, including post closure requirements, in 1988 (See 53 Fed. Reg. 28115, July 26, 1988). Post-closure care requirements for Class I hazardous waste injection wells are set forth at 40 CFR § 146.72. Prior to issuing the Class I UIC hazardous waste permits to EDS, EPA reviewed the post-closure plans for each injection well. Both EDS wells are required to comply with 40 CFR § 146.72 under the conditions of the Class I hazardous waste injection permits. By determining limits beyond which the hazardous constituents will not migrate through at least 10,000 years using conservative assumptions, the need for monitoring the plume movement is eliminated.

A condition of the no migration petition also requires compliance with the UIC permits.

XIX. Alternative Waste Management Options

1. Comment: Wouldn't it be better not to produce hazardous materials? If disposal options exist, we will never move to a sustainable economy.

Response: It would certainly be better not to produce hazardous wastes. As long as hazardous wastes are produced, however, there should be protective means of disposing of the wastes.

2. Comment: Technology today tells us that there is no need for disposal of hazardous wastes. There are other scientific alternatives which could save resources, perhaps ending our dependence on foreign oil. The May 2003, issue of *Discover* magazine discusses a process called thermal depolymerization which is a near perfect process for destroying pathogens because it breaks up compounds at the molecular level. Public policy ought to require reduction, recycling, and reusing waste.

Response: The Agency agrees with the goal of reducing or eliminating hazardous waste from manufacturing processes and recycling hazardous waste. However, until these aims are achieved for all waste streams, the Agency will continue to review existing waste disposal methods to ensure protection of human health and the environment. Disposal of hazardous wastes through deep well injection is a safe and proven technology as long as the disposal is being performed in accordance with the applicable UIC regulations.

The evaluation of alternative disposal methods is not a requirement of 40 CFR Part 148. EDS met the requirements of 40 CFR Part 148 subpart C. Because EDS's proposed injection meets these standards, EPA has determined that it is protective of human health and the environment.

Most of the hazardous waste injection wells in the nation are noncommercial wells which are operated onsite to dispose of waste produced by the company located at the site. Regulated commercial hazardous waste injection wells give companies that do not have adequate waste disposal options a safe method for disposal of their waste streams.

3. Comment: State mineral wells regulations require that injection be done in a manner which prevents waste. The proposed injection will cause waste.

Response: We are not sure which regulation was referenced in this comment. Section 324.61506 of Michigan's Natural Resources and Environmental Protection

Act, PA 451 (NREPA) requires the Supervisor of Wells to prevent waste which might arise as a result of injection associated with injection related to the production of oil and gas. An exemption from the LDR does not exempt the petitioner from other applicable requirements. That said, Michigan would determine whether that requirement applies to EDS's proposed injection. Michigan has issued a permit for the injection wells.

XX. Role of the Michigan Department of Environmental Quality

1. Comment: The Site Review Board (SRB) appointed by Governor Engler voted in March 2000 to recommend denial of the EDS Part 111 permit, citing such reasons as an unsuitable location, lack of need, and an unacceptable impact on the community resources. The MDEQ disregarded the recommendations and issued the permit.

Response: EPA is making a determination on EDS's petition for exemption from the LDR under 40 CFR Part 148 subpart C. This is not the appropriate forum for seeking review of the MDEQ's permitting decision.

The LDR exemption petition was not before the SRB, and the SRB's recommendations do not address the requirements of 40 CFR Part 148 subpart C. Therefore, there is no recommendation to EPA in the SRB's report. EPA's decision to deny or approve a facility's no migration petition is based upon a detailed technical assessment of the no migration standard. The siting criteria for Class I hazardous waste injection wells are listed in 40 CFR § 146.62 and were considered by EPA prior to issuing the EDS wells Class I hazardous waste permits on March 18, 1998. However, the EDS no migration demonstration was reviewed to confirm that the well's construction and area geology conformed to the requirements of 40 CFR Part 148 and would prevent the movement of injected hazardous wastes from the injection zone. As discussed in the preamble to the 40 CFR Part 148 regulations, "...the siting requirements of § 146.62 with regards to injected waste are either subsumed in the standard set in § 148.20 or rendered unnecessary by a successful demonstration. Moreover, the § 148.20 requirements are more stringent than the § 146.62 requirements." (53 Fed. Reg. 28117, at 28128, July 26, 1988)

2. Comment: EPA should request MDEQ to reconsider the previous decision and follow the decision of the original SRB.

Response: EPA's decision to deny or approve a facility's no migration petition is based upon the criteria at 40 CFR Part 148 subpart C. This is not the appropriate forum for seeking review of MDEQ's permitting decision.

3. Comment: The well was permitted only because the previous governor's administration made a deal with EDS to overrule the rights of the citizens of Michigan. We ask you to correct this mistake.

Response: EPA is making a determination on EDS's petition for exemption from the LDR under 40 CFR Part 148 subpart C. This is not the appropriate forum for seeking review of the MDEQ's permitting decision.

4. Comment: Information obtained from Hal Fitch, MDEQ, should be discounted because he is the head of the Oil and Gas portion of the MDEQ. His expertise does not include knowledge of injection wells.

Response: The information provided by the MDEQ was generally contained in documents and electronic data files which were not prepared for use in the review of the petition submitted by EDS. No information was obtained directly from Mr. Fitch.

XXI. Comments on Environmental Disposal Services, Inc. and its Funding

1. Comment: EDS has a record of environmental violations.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR part 148 subpart C. Past or present violations, if any, are not relevant to this determination unless they affect the criteria or the demonstration required for an exemption.

2. Comment: One commentor visited the site on June 18, 2001, and took pictures of four 55 gallon drums labeled as unregulated material. This is against the law because even if it is unregulated, the drum should be clearly marked for fire fighting personnel and workmen in the area. There were four other 55 gallon drums in bad condition rusting on the outside and only one was marked with the number 43.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR part 148 subpart C. If the drums of material observed by the commentor at the EDS facility were determined to be hazardous waste then their storage would be regulated under part 111 of Michigan's NREPA. Storage of non-wastes and non-hazardous wastes are not regulated by EPA.

3. Comment: You can't trust a for profit company to inject only the wastes which it has been permitted for.

Response: There are mechanisms for oversight and enforcement of permitting and other requirements. For example, the SDWA and the State and federal

RCRA hazardous waste statute and regulations provide authority for inspection and enforcement of their requirements. EPA intends to monitor and enforce its permitting requirements. Transportation of hazardous wastes is controlled by a manifest system. MDEQ's Waste Management Division will monitor the sources and types of waste delivered to the EDS facility. All loads brought to the facility will be documented and tested.

4. Comment: EPA has accepted the evidence presented by a company which is morally bankrupt rather than that provided by many honest people.

Response: In the course of its review, EPA evaluated the information submitted by the public as well as the information submitted by EDS and gathered information relevant to its determination. Based on its review, EPA determined that EDS has met the demonstration required by 40 CFR Part 148 subpart C. None of the comments received would cause EPA to set aside these findings under current conditions.

5. Comment: Governor Jennifer Granholm signed a bill into law that would ban companies from doing business that have violated the laws. EPA should look into this in granting EDS its petition.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. An exemption granted under this provision is limited to the LDR and does not exempt the petitioner from any other applicable requirements.

6. Comment: EDS is inexperienced in toxic waste disposal.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. EDS's petition and permit applications have indicated familiarity with the requirements for deep well injection of hazardous wastes.

7. Comment: Although the environmental and geological reasons are adequate to stop this project, the economic issues should also be considered. If a company is poorly capitalized and its investors are of unsavory character, it should not receive permits.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. Financial assurance for the EDS Class I hazardous waste injection wells was submitted by EDS and reviewed prior to EPA issuing the Class I UIC waste permits as required by 40 CFR Part 144, subpart F. Financial responsibility for closure and post-closure care was provided by EDS in accordance with 40 CFR §§ 146.71(a)(3) and 146.73, respectively.

8. **Comment:** Politicians in Detroit are running on promises to block any additional loans from the pension fund for EDS.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. As described above, EDS has provided financial assurance as prescribed in 40 CFR §§ 146.71(a)(3) and 146.73

9. **Comment:** EDS is not being required to maintain a tangible net worth ratio of total liabilities to net worth not less than 2.0 in accordance with the State of Michigan's General Rules governing oil and gas operations (effective September 20, 1996), specifically Rule 210(3)(A). EDS also fails Rule 210 (3)(B), in that their ratio of the sum of net income plus depreciation, depletion, and amortization to total liabilities is considerably less than 0.1. The company is being allowed to continue in existence at the support of EPA and has been carried for a decade by the MDEQ. Also Rule 210(3)(C), a ratio of current assets to current liabilities of more than 1.5, is not met.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. An exemption granted under this provision is limited to the LDR and does not exempt the petitioner from any other applicable requirements. This is not the appropriate forum to address such Michigan requirements, if applicable.
Contrary to the assertion that EDS exists at the behest and with the support of EPA, EPA has taken no action to provide support to EDS; its actions are limited to review of the applications and petition before it and oversight and regulation of operations under applicable federal requirements.

10. **Comment:** A commentor questioned the appropriateness of funding by the Detroit Police and Firefighter's Retirement fund and the alleged involvement of an MDEQ official, and said that an alleged conflict of interest at MDEQ calls for cessation of activities associated with high pressure toxic waste injection.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. This is not an appropriate forum to address the issues raised by the commentor.

11. **Comment:** The Policeman and Fireman's Retirement System of the City of Detroit might become a "potentially responsible party."

Response: The comment uses a term of art which suggests that the facility will become a Superfund site. A determination under 40 CFR § 148.20(a)(1) is based on a showing that the injected fluids will not migrate within 10,000

years vertically upward out of the injection zone, or laterally within the injection zone to a point of discharge or interface with a USDW. At least with respect to the proposed injection that is the subject of this determination, we do not expect the wells to become a Superfund site.

12. Comment: In the event of a problem, who is liable for contamination caused by the injected waste? What financial resources does the operator have to meet his liability for environmental harm?

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. EPA has reviewed EDS's petition in detail and has concluded that EDS has met those requirements, including the requirement to demonstrate that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. Accordingly, EPA believes the operation of the EDS injection wells under the no migration demonstration is protective of human health and the environment and will not result in contamination outside the injection zone.

Financial assurance for the Class I hazardous waste injection wells was submitted by EDS and reviewed by EPA prior to the issuance of the Class I UIC permits as required by 40 CFR Part 144, subpart F. Financial responsibility for closure and post-closure care was provided by EDS in accordance with 40 CFR §§ 146.71(a)(3) and 146.73, respectively.

In addition, EDS has applied for a RCRA hazardous waste facility operating license from the State of Michigan, and the RCRA provisions governing such permits and/or licenses require that they address corrective action under RCRA and financial assurance for corrective action.

XXII. EPA's Decision Making Process

1. Comment: The public notice states that the details of the proposal can be found in three local libraries. On January 7, the commentor visited all three local libraries. The library staff searched, but were not able to locate the documents. The Taylor and Romulus libraries said they did not receive the documents. The proposal was available on the EPA website, but it wasn't where it should have been. From the Region 5 home page, if you click on fact sheet, you get "page not available." The fact sheet was available under the public notice, not under fact sheet where it should have been located.

Response: The Notice of Intent was not sent to the repositories prior to the first public meeting as a result of a misunderstanding. EPA did not learn of this until the public hearing on January 8, 2003. The Notice of Intent was sent to the

repositories just after that hearing, the public comment period was extended, and another public hearing was held, on April 21, 2003. An electronic version of the Notice of Intent was available online at the Region 5 website, www.epa.gov/region5/water/uic/pubpdf/two-page.pdf, as mentioned in the announcement. Additionally, as stated in the public notice, during the public comment period, a copy of the complete administrative record, including the Notice of Intent, was available at the EPA's Region 5 office, located at 77 W. Jackson Blvd., Chicago, Illinois.

2. Comment: A copy of the transcript should have been placed in a library in Detroit. That would be more meaningful for those of us who are here.

Response: Copies of the hearing transcripts have been sent to the repositories at Romulus Public Library, 11121 Wayne Road, Romulus, Michigan; Taylor Community Library 12303 Pardee Road, Taylor, Michigan; and Henry Ford Community College's Eschlman Library, 501 Evergreen, Dearborn, Michigan. These locations are appropriate under the regulations. The documents should have been available there through the end of 2003.

3. Comment: Speakers at the January 8, 2003 public hearing were not given ample time to speak. The facilitator told speakers that they should limit themselves to three minutes so that everyone could have a chance to speak. The facilitator did not keep track of time not used by some speakers who might have given of their time to later speakers. The limit was arbitrary and prevented some speakers from completing their statements. The limitation is evidence of an adversarial attitude on the part of EPA.

Response: Under 40 CFR § 124.12(c), reasonable limits may be set up on the time allowed for oral statements, and the submission of statements in writing may be required. At the January 8, 2003 hearing, EPA set a limit of three minutes per speaker by dividing the number of minutes available by the expected number of speakers. The limit was set to give everybody who wished to speak equal time. This time limit was announced at the beginning of the hearing. During the hearing, a moderator would indicate when a speaker's 3 minutes had elapsed. Several speakers did not stop speaking when the facilitator told them that their three minutes had expired but were allowed to complete their comments. When all pre-registered speakers had spoken, the facilitator asked whether anyone else wished to speak. About four additional speakers who had not registered spoke. The invitation to speak was repeated, no one else responded, and the hearing was closed. Commentors also had the opportunity to submit written comments during the comment period. Moreover, EPA held a second public hearing.

4. Comment: One commentor questioned the behavior of EPA employees during the hearing and asserted that the behavior was a procedural error and should

void the January 8, 2003, meeting as an official hearing. The meeting should be rescheduled and redone in a proper manner befitting the importance of the issues being discussed. EPA appeared to be operating from an adversarial position in this matter.

Response: EPA held public hearings on January 8 and April 21, 2003, at the Crowne Plaza, 8000 Merriman Road, Romulus, Michigan. EPA held these hearings to solicit public comment. A court reporter was present at both hearings to record comments and prepare a transcript of the proceedings. EPA representatives present at the hearing were not responsible for taking down comments. The transcript prepared by the court reporter is the official record of the hearing. These transcripts were included in the Agency's administrative record. EPA invited comment on the draft determination set forth in the Notice of Intent. EPA considered all comments made at both hearings in detail prior to issuing a final decision on the no migration petition. Responses to these comments and to other comments received during the public notice period are included in this responsiveness summary. All participants at the public hearing were allowed an opportunity for comment. EPA representatives were present to check people in and to confirm anyone attending was provided an opportunity to speak or submit comments. Actions by EPA representatives did not preclude public comment. EPA did hold another public hearing on April 21, 2003, after it learned that the Notice of Intent had not been sent to the repository prior to the January 8, 2003 meeting.

5. Comment: EPA and MDEQ have done everything possible to fast track the EDS project.

Response: EPA is not in a position to respond on behalf of MDEQ, but will briefly relay the history of its review of EDS's petition for an exemption from the LDR. The original petition was submitted on January 21, 2000. EPA took care and time to review the petition to make sure that the requirements of 40 CFR Part 148 were met. EPA provided numerous comments regarding the adequacy of the demonstration and EDS submitted additional revisions and support and conducted additional tests.

In 2001, EPA held an availability session to inform the communities of Romulus and Taylor about the decision processes. EPA reviewed and approved the quality assurance plan in 2001, and EDS drilled the wells and gathered additional data, conducting mechanical integrity tests. A submission on January 31, 2002, incorporated changes based on the results of testing of the wells. EPA has carefully reviewed the new evidence developed through the drilling and testing of the two wells. The result is that details about the reservoir are more clear now, and those details have been used to refine the demonstration of no migration.

EPA contracted with USGS and LBNL to provide outside reviewers to ensure an objective, comprehensive, and expert review of the crucial issues of regional and site geology and validity and verification of the mathematical simulators used to predict waste movement. In June 2002, EPA informed EDS that additional testing was needed to demonstrate that the geological model of the reservoir is valid. The review was finally completed in October 2002. So, over a period of 31 months EPA reviewed the EDS no migration petition in detail. A Federal Register notice (67 Fed. Reg. 77981, December 20, 2002) describing the basis of the draft decision was prepared along with a fact sheet for distribution.

A public comment period to run until January 22, 2003, was announced on November 19, 2002. This public comment period was subsequently extended to May 16, 2003, to ensure that all interested parties had adequate time to review all the information and provide comments to EPA, and to October 6, 2003, to allow the public to comment concerning the permit issued by MDEQ to SPMT. Public hearings were held on January 8, and April 21, 2003. The approval process was thorough, lengthy, and provided adequate time for comment. It was not a "fast-track" process.

6. Comment: EPA intends to issue the exemption for the two wells. We're just going through the motions here. EPA is not really listening. The public notice system does not work; no one is listening. The communities have told you numerous times we don't want this. We are not big communities and you feel that you can just walk all over us.

Response: While EPA did listen to and consider all comments, a determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. EPA provided an extensive opportunity for public comment on this determination and did not make its final decision until it had reviewed and considered all comments.

EPA's decision to deny or approve the EDS no migration petition is based upon a detailed assessment of the no migration demonstration. EPA reviewed all the information, including the comments and information submitted during the public comment period, and determined that EDS had met the requirements of 40 CFR Part 148 subpart C. Those requirements do not include community approval.

7. Comment: One individual commented that he requested the following information but did not receive it: access to local geographic information systems; electronic data collected from logs and the software used to create it; mathematical formulae, figures and results provided secretly to EPA; a wide variety of maps; and mathematical models.

Response: While several letters and e-mails were received from this commentor, they only requested information about the data and how it could be accessed. The information requested was provided. EPA also provided the commentor with instructions for requesting additional information under the Freedom of Information Act. In discussions with the commentor, an EPA representative explained that EPA could not provide him with proprietary software. However, software packages such as SWIFT II and MODFLOW are available in the public domain. The information needed to run the simulations is in the Notice of Intent. All information provided to EPA regarding this determination has been placed in the administrative record.

8. Comment: One commentor offered to review the administrative record at EPA's offices on weekends and holidays to avoid disrupting the normal office routines.

Response: This entire record is available to the public, but is very voluminous, and the commentor chose to review only the petitions themselves at the EDS facility.

The federal building where the records are located is not accessible to the public on weekends and holidays; but the public is welcome to make arrangements to view the records during regular business hours, or to request copies pursuant to the Freedom of Information Act.

9. Comment: One commentor said that on several occasions he requested electronic data logs of the modeling runs to be provided. EPA responded that it had no access to the software that was used to run the mathematical models. While reviewing the petition at the EDS office, he found a CD containing the information he says that he was told did not exist.

Response: This is an incorrect interpretation of events. The commentor asked about the availability of the data sets used to create the mathematical model. A copy of the Notice of Intent which includes the data which constitutes the basis of the model was sent via e-mail. The information in the document supplemented by some information available in reference manuals should be sufficient to allow reproduction of the simulations. The commentor was told that all information is available at EPA's office in Chicago and could be sent for the cost of reproduction. The commentor did not request that this information be sent to him.

The CD in question contains the output from the simulation of plume movement from the SWIFT II program. This is a limited portion of the entire modeling effort, and was only used to verify the results of an analytical simulation. EPA sent a copy of the CD to the commentor on May 2, 2003.

10. Comment: The requestor clarified that he wanted the electronic data used to print out the geophysical logs but was told that EPA did not have access to that information.

Response: The entire correspondence between EPA and the commentor is in the administrative record for this decision and it does not contain a request for the data sets from geophysical logs.

It is possible to evaluate results without having the software used to create the data set. EPA reviewed paper copies of the log data. Review of the graphical presentations of this data is more efficient than review from magnetic media because of various scales used and the complexity of the data. EPA can and does extract data from data sets from geophysical logging tools to produce specialized views of data from various depth intervals, but the actual software which allows simultaneous use to be made of the data is proprietary, and is not available to us.

As an alternative, EPA uses Lotus 1 2 3 to graph selected log data. The depths are placed on the x-axis and whichever data are desired are graphed on the y-axis. Lotus 1 2 3 allows only two scales on the y-axis. Well logs typically have five or more different scales on the same log.

11. Comment: All of the information provided to EPA should be available on the internet.

Response: The petition and its supporting documents are voluminous and most was never produced in digital format.

12. Comment: The community needs a full disclosure of everything that's going on with the EDS and SPMT projects and the three wells for these two businesses.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. EPA has reviewed EDS's petition in detail and has concluded that EDS has met those requirements, including the requirement to demonstrate that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. EPA has included all of the information it relied upon in reaching this determination in the administrative record for this decision. EPA has a separate administrative record for the UIC permit of the SPMT injection well. EPA extended the public comment period on the EDS petition until October 6, 2003, to solicit input on the MDEQ permit to SPMT for an extraction well.

13. Comment: One of the EPA employees associated with the decision is from eastern Europe and has not mastered the English language. If she cannot be understood, any "science performed" by this individual might be suspect.

As the meeting apparently turned on two points this person brought up, the meeting should be repeated to ensure that proper communication has occurred.

Response: This comment refers to the accent of one of the employees answering questions at the information session that preceded the public hearing on January 8, 2003. The ability of the public to provide comments during the January 8, 2003, public hearing was not affected by the public's understanding of statements made by an EPA employee prior to accepting comments for the record. The information sessions held prior to the January 8, 2003, public hearing was for informational purposes only. EPA held public hearings to solicit public comment. A court reporter was present at both hearings to record everything that was said and prepare a transcript of the proceedings. The transcript prepared by the court reporter is the official record of the hearing. These transcripts were included in the Agency's administrative record. EPA reviewed in detail and considered all comments made at both hearings prior to issuing a final decision on the no migration petition.

14. Comment: As a result of unfair preferential treatment of EDS by EPA and the MDEQ, unfair stress has been placed upon the local community of Romulus, Michigan. Unfair restriction of free enterprise has resulted as the requests for brine well permits, to extract brine for metal pickling and food preservation operations, have not been considered because the proposed high pressure hazardous waste injection well has proven to be a cash cow for the proponents. The brine extraction operations would not inject hazardous wastes, but potentially employ several people in the Romulus community. Other uses for the brine have been pushed aside for the EDS operation.

Response: EPA has not given preferential treatment to EDS. A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. EPA has reviewed EDS's petition in detail and has concluded that EDS has met those requirements, including the requirement to demonstrate that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. EPA does not regulate the production of brine and consequently does not receive or rule on requests for brine production permits, which are handled by the State.

15. Comment: EPA is infringing on the recycling industry and various chemical and treatment concerns expert at the disposal and recycling of these noxious chemicals. American and Canadian recyclers are suffering because EDS is being supported by free research by EPA. The government is illegally working with, encouraging, backing, supplying and financing EDS in

violation of the North American Free Trade Agreement. Without this government assistance the business would fail.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. This regulation does not contain any provisions allowing for the consideration of competing waste management options. EPA has reviewed EDS's petition in detail and has concluded that EDS has met those requirements, including the requirement to demonstrate that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. Any research conducted by EPA in reviewing this petition was conducted in order to determine whether the petition met the requirements of Part 148 subpart C.

The commentor does not identify the basis for these allegations. EPA has merely acted pursuant to RCRA Section 3004 and 40 CFR Part 148 subpart C on the petition submitted to it by EDS for an exemption from the LDR for deep injection wells.

16. Comment: Region 5 does not have an expert in the field of human health/children's health. There is no one to speak authoritatively about the effects of very small exposures of chemicals which will be trucked into the area and then injected.

Response: EPA Region 5 does have a children's health expert. A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. EPA has reviewed EDS's petition in detail and has concluded that EDS has met those requirements, including the requirement to demonstrate that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. An exemption from the LDR under Part 148 does not exempt a petitioner from other applicable requirements of RCRA or other laws that might apply to transportation and storage of materials.

17. Comment: One commentor used notes, purportedly from a meeting involving EPA in Chicago, as evidence that "The EPA is going far beyond its mandate by discussing insurance arrangements for companies operating with chemicals and they are entering the realm of private enterprise. This is interference in the economy. They are causing heavy costs and charges to American industry, especially to dependable business men. Their expertise in cleaning up the environment has not been proven, it cannot be guaranteed that they will be expert at stopping pollution by selling insurance policies."

Response: EPA does not sell insurance. Both RCRA and SDWA have requirements for financial assurance, and insurance policies are one way of addressing

those requirements. In ascertaining whether such requirements are met, EPA reviews the financial assurance mechanisms used to meet them.

18. Comment: A notice of a public meeting on a request to enlarge a hazardous waste management cell under the Toxic Substances Control Act was presented as evidence that "Apparently the EPA is unable to control the toxic substances that they are 'liberating' from the environment." The commentor argues that contaminated material should be utterly destroyed or moved to a safe site.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. EPA has reviewed EDS's petition and has determined that EDS has met those requirements and that EDS's proposed injection of restricted hazardous wastes into its deep injection wells will be protective of human health and the environment. The public meeting cited above is part of the process of deciding whether the operator of a hazardous waste landfill can enlarge that landfill. It implies nothing of any failure, just that there is additional waste which must be disposed of safely. The meeting is part of the public involvement process to ensure that the landfill meets TSCA requirements.

19. Comment: It is conceivable, although unproven, that EPA will allow its contractors to dump much of the stuff they are liberating down the EDS well.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. After a petitioner obtains an exemption and any other approvals, authorizations, permits and/or licenses applicable to its operations it can inject the wastes allowed to be injected under the exemption, approval, authorizations and/or licenses. Among other things, EDS must still seek amendment to its UIC permit for approval of wastes from specific sources. The exemption merely exempts them for the land disposal restriction requirements from certain restricted wastes. It does not identify the sources of those wastes, or exempt the petitioner from other applicable requirements. Deep well disposal can be used for disposal of liquid wastes only.

20. Comment: The regulations established to allow this process to go forward are contrary and lack cohesiveness and legal binding power. For example, the RCRA list submitted is not dependable because under RCRA regulations, the obligation for assigning hazardous waste codes lies with the generator of the waste.

Response: EPA disagrees that these regulations are "contrary and lack cohesiveness and legal binding power" or are undependable. Moreover, the regulations were duly promulgated and challenges to the promulgation of such regulations should have been brought at the time they were issued. For

example, RCRA Section 7006, 42 U.S.C. § 6976, sets forth the timeframe for petitioning to review an action promulgating regulations under RCRA.

21. Comment: Many of the wastes to be disposed of at this site are of the type that EPA has been liberating. The wastes have been stored at various depots around the State and will be dumped down the well. This closed system bars recyclers from the market and fosters a government bureaucracy.

Response: As discussed above, determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. As discussed at 40 CFR § 148.20(a), these regulations apply to petitions for exemption from a prohibition for the injection of restricted hazardous waste into an injection well. The petition seeks an exemption for restricted listed and characteristic hazardous waste identified in 40 CFR Part 261. Part 261 identifies many wastes. At this time, EDS has not specified the sources of the waste streams it plans to inject. EDS will identify sources and submit them for EPA approval under the UIC permit before injection.

22. Comment: EPA has not acted on behalf of the people, but is acting on behalf of EDS. We pay your salary, you work for us, but we don't believe what you say. The EPA Region 5 Director said that if EDS wanted to fast-track the process, they proceed at their own risk. If SPMT gets their permit, they're out of business, they are all done. There's nothing in the law that says you can't put this on the back burner and wait until justice prevails.

Response: EPA is not acting on behalf of EDS. It is acting pursuant to RCRA and the requirements of 40 CFR Part 148 subpart C on a petition submitted under 40 CFR § 148.20. As discussed above, EPA has not placed this petition on a "fast track." For a discussion of the impact of the SPMT State permit for an extraction well, see the responses to comments on that permit below.

23. Comment: A commentor claims that the local governments and EPA have ignored health risks which already exist and rejects any use of injection wells to dispose of chemicals, especially in populated areas.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. Those regulations require the petitioner to demonstrate that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. Based on its review of the petition, EPA has determined that the proposed EDS injection meets this standard and is protective of human health and the environment. As discussed above, an exemption under these regulations does not exempt the petitioner from other applicable requirements.

24. Comment: EPA should consider the entire Toxic Release Inventory (TRI) levels for the area before it issues any permits.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. Those regulations require the petitioner to demonstrate that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. They do not include consideration of TRI levels for the area. Based on its review of the petition, EPA has determined that the proposed EDS injection meets this standard and is protective of human health and the environment. Please note that a 1994 Toxics Release Inventory, Public Data Release, Executive Summary, noted that, "Direct releases, such as air emissions, may pose a greater threat to human health and the environment than more contained releases, such as underground injection." EPA is proposing (68 Fed. Reg. 39074, July 1, 2003) a new reporting form which will differentiate "contained disposal" from "direct release" to the environment.

25. Comment: The process is flawed.

Response EPA disagrees. EPA's determination on the EDS's petition for a no migration exemption fulfills the Agency's statutory mandate with respect to the issuance of exemptions in cases where proper containment of wastes within the injection zone is demonstrated by petition. RCRA authorizes EPA to exempt a disposal method from the RCRA land disposal ban if EPA specifically determines that the disposal will be protective of human health and the environment, RCRA Section 3004(d)(1), (e)(1), (f)(2), and (g)(5), 42 U.S.C. § 6924(d)(1), (e)(1), (f)(2), and (g)(5). EPA issued regulations in 1988 establishing criteria and procedures for no migration petitions to demonstrate compliance with the protectiveness standard, 40 CFR §§ 148.20 - 148.24.

As discussed above, EPA interprets the "reasonable degree of certainty" standard, as used in Section 3004 of RCRA and 40 CFR Part 148, to require that the petitioner provide 'reasonably trustworthy information and data such that the totality of the facts and circumstances within the Agency's knowledge be sufficient in light of its scientific and technical expertise, to warrant a firm belief that no migration of hazardous constituents from the injection zone will occur in 10,000 years.' A no migration determination is based on the interpretation of data and the use of conservative assumptions to characterize the injection zone and to predict waste movement.

A determination that there will be no migration, with a reasonable degree of certainty, is based on the interpretation of data and the use of conservative assumptions to characterize the injection zone and to predict waste

movement. Additionally, the public is afforded an opportunity to comment on proposed decisions by EPA, and to provide technical data or information which address the Agency's decision-making criteria. EPA reviewed in detail the no migration petition and has determined that EDS has met the requirements of 40 CFR Part 148 subpart C and that the proposed injection is protective of human health and the environment. EPA provided extensive opportunity for public comment and held two public hearings on the matter in addition to several information sessions. EPA considered all comments, data, and other information submitted during the public comment period in reaching its decision.

26. Comment: How can the citizens of Michigan trust EPA to put a stop to these hazardous waste injection wells which could have a detrimental effect on the health and well being of those living near the wells?

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. Those regulations require the petitioner to demonstrate that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. Based on its review of the petition, EPA has determined that the proposed EDS injection meets this standard and is protective of human health and the environment.

27. Comment: We have been coming to these meetings for 10 years, why?

Response: Over the past 13 years, a number of meetings have been held as part of the processes for the various approvals needed before the wells can operate. For example, EPA held public hearings on EDS's UIC permit, SPMT's UIC injection well permit and the draft land disposal restriction determination. In the case of the land disposal restriction determination, 40 CFR § 148.22(b) provides for public notice and an opportunity for public comment in accordance with the procedures in 40 CFR § 124.10 of the intent to approve or deny the petition. EPA extended the comment period and provided a second public hearing so that the public would have an opportunity to review certain information when preparing comments. EPA has considered the comments submitted in reaching its decision.

28. Comment: EDS scheduled this hearing (January 2003) for this time to sneak something in.

Response: EDS had nothing to do with the schedule. EPA issued press releases and published notices in local newspapers concerning the public hearing. Prior to the first public hearing, EPA held an information session and answered questions. The original public comment period was initially scheduled to expire on January 22, 2003. When advised that the Notice of Intent was not

at the repository before the first public hearing and requested additional opportunity for comment, EPA extended the public comment period until May 16, 2003, and held a second public hearing. After learning of the permit the State issued to SPMT for an extraction well on May 29, 2003, EPA extended the comment period until October 6, to take additional comment on the State permit. The public hearings were held in the evening so that people could attend after working hours.

29. Comment: Canadian environmental regulation is more effective than that in the U.S. In Canada, nothing is done with waste without a permit and when a question is asked, it is answered.

Response: EDS needs its UIC permit and State RCRA license in addition to this exemption before it can operate its hazardous waste facility. EPA is responding to comments received on the Notice of Intent to grant an exemption in this responsiveness summary.

30. Comment: EPA's mandate in this matter covers only the protection of drinking water. Therefore the EPA reviewer cannot remark upon anything other than the geology of the strata containing drinking water. EPA cannot claim knowledge of "pumping technology, building skills, construction skills and techniques, traffic patterns, terrorist risk, risk to transportation facilities, subsidence, mixing of chemicals to produce other chemicals, or even levels of safety."

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. Those regulations are promulgated under RCRA and are designed to protect human health and the environment, including but not limited to USDWs. They require the petitioner to demonstrate that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. Based on its review of the petition, EPA has determined that the proposed EDS injection meets this standard and is protective of human health and the environment. Regulations promulgated under SDWA at 40 CFR Part 146 provide additional protection of USDWs. In reviewing the Part 148 petition and drafting the UIC permits, EPA, among other things, evaluates information about formations above and below the USDWs and well construction. EPA's staff has knowledge of subsurface geology, hydrology, reservoir engineering, and the technologies required to conduct and interpret the tests, modeling, and simulations needed to demonstrate that injected wastes will not migrate from the injection zone for a period of 10,000 years. Neither the granting of the land disposal restriction exemption nor the issuance of a UIC permit relieve EDS from meeting other applicable requirements and/or obtaining other approvals.

31. Comment: EPA has no legitimate mandate to address activities affecting aquifers which do not contain potable water.

Response: SDWA authorizes EPA to regulate injection into aquifers below USDWs. Regulations of such aquifers is required to prevent contamination of USDWs resulting from the movement of liquids from deeper formations into the USDWs. Moreover, the exemption regulations at 40 CFR Part 148 are promulgated under RCRA and are designed to protect human health and the environment, not just sources of drinking water.

32. Comment: EPA should deny the petition as a matter of conscience and let the courts settle the matter.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. Those regulations are promulgated under RCRA and are designed to protect human health and the environment. They require the petitioner to demonstrate that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. Based on its review of the petition, EPA has determined that the proposed EDS injection meets this standard and is protective of human health and the environment. Having determined that the proposed injection meets the requirements of 40 CFR Part 148 subpart C and is protective of human health and the environment, EPA has granted the exemption pursuant to its authority under RCRA and SDWA and their implementing regulations at 40 CFR Parts 146 and 148. The Agency must review permit applications and land ban exemption petitions submitted under its governing statutes. EPA's decision to deny or approve a facility's no migration petition is based upon a technical assessment of the no migration demonstration according to the requirements of 40 CFR Part 148. In making this decision, EPA consulted with USGS and LBNL. EPA has merely acted pursuant to RCRA Section 3004 and 40 CFR Part 148 subpart C on the petition submitted to it by EDS for an exemption from the LDR for deep injection wells.

33. Comment: Administrator Whitman, under the direction of the White House, does not intend for EPA to carry out its mandate.

Response: EPA has acted pursuant to RCRA Section 3004 and the implementing regulations at 40 CFR Part 148 subpart C on the petition submitted to it by EDS for an exemption from the LDR for deep injection wells. Based on its review of the petition, EPA has determined that the proposed EDS injection meets the standards and requirements for such an exemption and is protective of human health and the environment.

34. Comment: Does Russell Harding have any influence in EPA decisions?

Response: Russell Harding, the former MDEQ Director, has not had any influence on this decision. A determination on a petition for exemption from the LDR for deep well injection is governed by RCRA and the requirements of 40 CFR Part 148 subpart C.

35. Comment: The land ban decision is recognizable as a political decision, not based on sound science, and not based on community health and welfare.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. Those regulations are promulgated under RCRA and are designed to protect human health and the environment. They require the petitioner to demonstrate that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. Based on its review of the petition, EPA has determined that the proposed EDS injection meets this standard and is protective of human health and the environment. A determination that there will be no migration, with a reasonable degree of certainty, is based on the interpretation of data and the use of conservative assumptions to characterize the injection zone and to predict waste movement. EPA's decision to deny or approve a facility's no migration petition is based upon a technical assessment of the no migration demonstration according to the requirements of 40 CFR Part 148. In making this decision, EPA consulted with USGS and LBNL. EPA decisions concerning no migration demonstrations include an analysis of scientific and engineering data.

36. Comment: EPA has taken the side of EDS "because big money talks." EPA would permit anything for a price.

Response: Neither EPA nor its employees receive any benefits or compensation from the issuance of permits or land ban exemptions, nor do the operators of Class I injection wells pay any fees to EPA. EPA has reviewed a petition for an exemption from the LDR for deep underground injection pursuant to RCRA and the regulations at 40 CFR Part 148 subpart C. Based on its review of the petition, EPA has determined that the proposed EDS injection meets the standards and requirements for such an exemption and is protective of human health and the environment.

37. Comment: What actions can EPA take if the assumptions upon which the demonstration is based prove invalid or if EDS fails to follow standards?

Response: The assumptions upon which the demonstration is based are conservative. If, however, any information becomes known which shows the demonstration to be erroneous, the exemption could be terminated as described in 40 CFR § 148.24 and the wells would have to cease injection.

Note that if EDS fails to comply with any condition of the exemption, the exemption may be terminated and that there are sanctions for failure to comply with the requirements of permits, exemptions or regulations.

38. Comment: Will the Water Division Director be fired to make room for someone who will approve the exemption if she won't?

Response: Certainly not. A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. Based on its review of the petition, EPA has determined that the proposed EDS injection meets this standard and is protective of human health and the environment.

39. Comment: Your decision will affect many people including innocent children who don't understand why their parents will have to leave their homes. My neighbors and I will not wait for our area to be known as another Love Canal.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. Based on its review of the petition, EPA has determined that the proposed EDS injection meets this standard and is protective of human health and the environment. Based on our review, the planned injection should not provide a reason to move. As previously noted, the disposal of wastes at Love Canal was unregulated. The injection operation proposed by EDS has been the subject of an intense review, and EPA has determined that the proposed injection will be protective of human health and the environment.

40. Comment: Young people should not have to worry about environmental pollution, hazardous wastes dumped in their backyards or poisons emitted into the drinking water and into the air.

Response: EPA shares the concern regarding environmental pollution. Based on its review of the petition, EPA has determined that the proposed EDS injection meets the standards and requirements of 40 CFR Part 148 subpart C and is protective of human health and the environment.

41. Comment: Government officials do whatever they want and do not care about the public.

Response: EPA disagrees. Based on its review of the petition, EPA has determined that the proposed EDS injection meets the standards and requirements of 40 CFR Part 148 subpart C and is protective of human health and the environment. EPA provided extensive opportunity for public comment on this determination and has considered the comments submitted in reaching its final decision.

42. Comment: EPA has worked for ten years to force this project through.

Response: EPA has not "forced this project through." EPA has merely acted pursuant to RCRA Section 3004 and 40 CFR Part 148 subpart C on the petition submitted to it by EDS for an exemption from the LDR for deep injection wells. Based on its review of the petition, EPA has determined that the proposed EDS injection meets the standards and requirements for such an exemption and is protective of human health and the environment.

43. Comment: The Detroit River is terribly polluted and someone allowed the businesses responsible to do it.

Response: EPA does not think it is a matter of allowing businesses to pollute, but rather that pollution occurred due to practices that were allowable or acceptable prior to EPA's existence or the formulation of rules and regulations to prohibit such practices. In its thirty years of existence, EPA has responded to evolution of industrial operating principles and practices by countering with rules and regulations that prevent industries from contaminating their surroundings. EPA's charter is to protect human health and the environment by enforcing applicable rules and regulations which will prevent pollution. EPA has increasingly dealt with polluters as appropriate, either by constant vigilance of their activities or through enforcement. A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. EPA's review of the demonstration of no migration submitted by EDS has determined that the injection proposed by EDS will not result in additional contamination of the Detroit River.

44. Comment: EPA is operating under severe resource restrictions and cannot regulate this facility effectively.

Response: Since the creation of the UIC program, EPA has regulated Class I wells effectively. Because of the concern regarding hazardous waste management, EPA devotes sufficient resources to the inspection and oversight of hazardous waste injection wells to ensure compliance with permit requirements and protection of USDWs.

45. Comment: EPA does not have enough trained and experienced personnel. In fact, the current UIC Branch chief is only acting in that capacity. It is unclear why there is need for such a position in any case. The lack of trained personnel cries out for the involvement of private contractors acting from a profit motive.

Response: EPA disagrees. The Region 5 UIC Branch does have trained and experienced personnel and now has a permanent Branch Chief, who oversees the UIC program in the Region. As noted above, EPA employees

are not influenced by a profit motive. In addition, to ensure thoroughness and technical accuracy, the UIC Branch consults outside experts as peer reviewers.

46. Comment: EPA does not have the will and commitment to protect the community. EPA is against enforcement action. During EPA's reviews, if a violation is identified, EPA is not going to enforce. EPA may rewrite the permit so the violation goes away. The general enforcement history of EPA and MDEQ indicates that any enforcement action will only happen after a catastrophic event has occurred. The enforcement action will not remediate or compensate the victims of the damage of the event.

Response: EPA disagrees that the Agency is not committed to the protection of human health and the environment. Any modifications to permits are made in compliance with 40 CFR §§ 144.39 and 144.41. Class I hazardous injection operations must continue to meet the requirements of 40 CFR § 146.67. Past history of the Region 5 UIC program's enforcement efforts can be found at www.epa.gov/region5/water/uic/uicenfor.htm, which demonstrates that enforcement actions do not require catastrophic events. Pursuant to SDWA, EPA has enforcement authority for administration of the Class I UIC program; therefore UIC Class I permit and no migration petition compliance is verified by EPA Region 5 personnel. Compliance activities include conducting inspections as well as review of information submitted by the operator. Any violation of a UIC permit or no migration petition approval condition is subject to EPA enforcement action.

47. Comment: The risks should be compared to the reasonable certainty. If the waste finds an unknown fissure, causes an earthquake, or contaminates drinking water, the damage cannot be undone or controlled.

Response: EDS has demonstrated, to a reasonable degree of certainty, that there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous pursuant to 40 CFR Part 148 subpart C. As discussed above, EPA interprets the "reasonable degree of certainty" standard, as used in Section 3004 of RCRA and 40 CFR Part 148, to require that the petitioner provide reasonably trustworthy information and data such that the totality of the facts and circumstances within the Agency's knowledge is sufficient, in light of its scientific and technical expertise, to warrant a firm technical judgement that no migration of hazardous constituents from the injection zone will occur in 10,000 years. A no migration determination is based on the interpretation of data and the use of conservative assumptions to characterize the injection zone and to predict waste movement. With respect to the prospect of vertical migration of wastes through fractures or fissures within the confining strata within the injection zone, no evidence in the well data or subsurface geology suggests that such avenues for migration exist. Area seismic activity and induced

seismicity from injection were also addressed in the no migration demonstration. In addition to the requirements of Part 148, the requirements of 40 CFR Part 146 for UIC wells injecting hazardous wastes also provide protection of USDWs.

48. Comment: Injecting untreated hazardous waste into the ground is the most primitive form of waste disposal still allowed. Regulation is inadequate to control the risks, and the long term costs for the use of this technology have not been determined.

Response: There have been quite a number of studies, both by the federal government and individual states which address this concern. One of the earliest EPA studies was "The Report to Congress: Waste Disposal Practices and Their Effects on Ground Water" [EPA-570/9/77/001], January 1977, Chapter XIII of which is devoted to injection wells. Another major EPA report was issued in June 1977 entitled "Review and Assessment of Deep-Well Injection of Hazardous Waste" [EPA-600/2-77-029], which consists of four volumes and over 1,400 pages. Another EPA report is entitled "Report to Congress on Injection of Hazardous Waste," dated May 1985; this report is available on the EPA web site at http://www.epa.gov/safewater/uic/pdfs/19506.pdf in Adobe Portable Document File (PDF) format. The U.S. General Accounting Office produced an independent report in August 1987 entitled "Hazardous Waste: Controls Over Injection Well Disposal Operations" [GAO/RCED-87-170]. More recently EPA published a "Study of the Risks Associated with Class I Underground Injection Wells [EPA 816-R-01-007]" in March 2001; this report is also available on the EPA web site at http://www.epa.gov/safewater/uic/classonestudy.pdf in PDF format. The EPA national UIC web page lists many other reports related to this program which you can view online. Please check http://www.epa.gov/safewater/uic/qry_smallAllUIC_Files.html. In general, these reports conclude that properly constructed and operated injection wells are protective of human health and the environment.

49. Comment: Wells have failed resulting in the contamination of drinking water.

Response: Proper operation of injection wells prevents contamination of USDWs. EPA has determined that properly constructed and operated injection wells that meet the requirements of 40 CFR Part 148 subpart C are protective of human health and the environment. The SDWA specifically protects USDWs and the requirements promulgated under SDWA at 40 CFR Parts 144 and 146 provide added protection from contamination of drinking water. As noted previously, there have been no incidents of contamination of USDWs caused by Class I injection wells since implementation of the UIC regulations.

50. Comment: The final condition described in the Notice of Intent differs in nature from other conditions placed on exemptions in that it provides EDS the opportunity to avoid submitting data on the effects of proposed mineral extraction wells.

Response: EPA can ascertain whether SPMT is operating an extraction well without submissions from EDS. EPA also can and has modeled the effects of a mineral extraction well constructed to extract brine from the injection zone or shallower formations within the area of review using data in the petition. EPA's condition in the final determination considers the results of this modeling.

51. Comment: One commentor stated that at more than one meeting he attended he heard EPA's lawyer state that even though a change had been made, they were going to change the order and behave as if it had always been in that form.

Response: It is not clear what meeting or statement, if any, is referenced in this comment. There has been no order issued for this petition. The Notice of Intent reflected a draft determination, however, and was subject to change pending public comment.

XXIII. Concerns about Political Influence

1. Comment: Campaign contributions to former Governor Engler of Michigan influenced the decision-making process. Former State government officials, including former Governor Engler, got campaign contributions from the company. Therefore, the will of the people has been disregarded. The company with a track record of violations has been rewarded.

Response: EPA is not in a position to respond on behalf of MDEQ. A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. State officials did not have a role in EPA's decision-making procedure regarding the UIC permits or the land ban determination for EDS, although their comments, as well as other public comments, were considered.

2. Comment: Local politicians will gain economic benefits from EDS.

Response: EPA is not in a position to respond on behalf of State or local officials. A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C.

3. Comment: Nobody wants this injection well except the political office holders, both past and present, who accepted bribes so that the well could be built.

Response: EPA is not in a position to respond on behalf of State or local officials. EPA's determination on EDS's petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. EPA made this determination after review of the petition submitted by EDS under RCRA Section 3004 and 40 CFR Part 148 subpart C. EPA and its employees were not bribed.

4. Comment: A commentor asserted that the decision was moved out of the State because the new Democratic administration will fight pollution.

Response: The State of Michigan has never been authorized to issue a determination on a petition for an exemption from the LDR for deep underground injection under RCRA and does not have primacy for a UIC program under SDWA. EDS requires a number of State and federal permits, approvals and/or licenses for its operations. Although the MDEQ is the agency that issues State water law permits and RCRA hazardous waste treatment, storage, and disposal facility licenses, UIC permits and exemptions under 40 CFR Part 148 are issued by U.S. EPA in the State of Michigan.

5. Comment: One commentor asked how long EPA had been involved, if EPA representatives were Republican, if the State of Illinois was Republican, and if the Governor was Republican.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. EPA has been working on the EDS wells since EDS submitted its first UIC permit application to EPA in 1990. Political affiliations are not a 40 CFR Part 148 criterion and were not considered in this no migration petition decision.

6. Comment: Power and money have been factors in the government's decision-making process.

Response: EPA is not in a position to respond on behalf of State or local officials. EPA's determination on EDS's petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C.

7. Comment: The government is illegally working with, encouraging, backing, supplying and financing EDS in violation of the North American Free Trade Agreement. Without this government assistance the business would fail.

Response: EPA disagrees. The commentor did not identify the basis for this allegation. EPA has only acted pursuant to SDWA and RCRA and their implementing regulations on applications for permits and petitions submitted by EDS.

8. Comment: No further financial requirements, bonds, or fees have been levied on EDS in light of the changed manner of operation or make up of the waste stream that it proposes to inject. This gives EDS an unfair advantage in the marketplace and places EPA in the position of being a finance company through the scientific services provided as well as the public relations services provided. This is unfair and illegal interference by a federal agency in a free market of the United States and in Michigan's State economy as well as providing devastating influence upon the local economy of Wayne County and the City of Romulus.

Response: Financial assurance for their Class I hazardous waste injection wells was submitted by EDS and reviewed prior to EPA issuing the Class I UIC permits as required by 40 CFR Part 144, subpart F. Financial responsibility for closure and post-closure care was provided by EDS in accordance with 40 CFR §§ 146.71(a)(3) and 146.73, respectively. EPA has only acted pursuant to SDWA and RCRA and their implementing regulations on applications for permits and petitions submitted by EDS. Further financial assurance also may be required under the State RCRA hazardous waste license which EDS has applied for.

XXIV. Community Concerns

1. Comment: Andy Hartz of the MDEQ identified wetland issues on the EDS property. EPA withdrew its objections to MDEQ's Part 111 permit.

Response: When the Part 111 permit was proposed, both EPA and the Army Corps of Engineers objected. The objections to the wetlands fill permit were withdrawn because additional information provided by EDS, including a wetland mitigation proposal, demonstrated compliance with EPA's Clean Water Act Section 404(b)(1) guidelines. EPA requested that mitigation be required as a condition of the wetlands fill permit. Our determination is limited to the granting of the exemption from the LDR under 40 CFR Part 148. The UIC land ban regulations at 40 CFR Part 148 provide a list of standards for the decision. These standards focus on the containment of injected wastes and do not include wetland concerns. This is not the forum for raising issues regarding the State permit or the wetlands permit. On December 16, 2003, the Court of Appeals of the State of Michigan ruled that MDEQ did not err in issuing the Part 111 permit for construction of the EDS facility at the Citrin Drive location.

2. Comment: There are several gasoline storage tank farms within a mile of the facility. Any problems at one location could lead to environmental damage or possible fires at the other.

Response: This is not a 40 CFR Part 148 issue and was not considered during the petition review process. However, EDS's permits do not allow them to inject wastes which are characteristic for ignitability or reactivity under 40 CFR §§ 261.21 and 261.23. Although the existing tank farms might present hazards to other operations in the area, the risk to the EDS facility, particularly to the wells, will be minimized because wells No. 1-12 and No. 2-12 are constructed of heavy steel and cement. The diameters of the outer casings are 20 inches and 16 inches, respectively. These casings extend to depths of 119 feet and 169 feet, respectively. Within these outer casings, there are three smaller casings. The spaces between the casings are filled with cement. The two smaller casings are 9 5/8 inches and 7 inches in diameter. Their walls are over 0.35 inches thick and 0.4 inches thick, respectively. The wellhead is attached to the 9 5/8-inch casing. As a result, the casings have walls of two inches of steel and concrete above the surface, and almost 4 inches of steel and concrete below the surface. The wellhead is built to withstand 3,000 psi pressure and the piping is also constructed to withstand high pressures. The facility will have a limited volume of tank storage at the surface and the tanks are located in sealed concrete sumps. In addition, the wells can be shut off at the wellhead to prevent a back flow. As discussed above, well construction, operation, testing, monitoring and reporting requirements in the UIC permits and regulations can detect and avert potential problems.

3. Comment: Because of the facility's location near the Detroit Metro airport, there is a chance an airplane could crash into the facility. There was an airplane crash just 3/4 of a mile west of the site in 1987. What if terrorists hijacked a truck full of hazardous waste and drove into Metro Airport? Who would stop them? How many lives would be lost? The above ground storage tanks could be potential terrorist targets.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. EPA has also issued UIC permits to EDS for its Class I hazardous waste injection wells. Among other things, the permit requires continuous monitoring of the injection well, alarm systems and automatic shut-down mechanisms under 40 CFR Part 146. There are other State and federal agencies that regulate hazardous waste activities and transportation. EPA is authorized to act pursuant to its governing statutes. This is not the appropriate forum for questions on potential response to terrorism.

4. Comment: There are many risks. The EDS area is dangerous because of heavy truck traffic and location near Interstate 94. Romulus is already a heavily-traveled area with the airport and commuter traffic. The surrounding local infrastructure including roadways and lighting systems are inadequate for the increased load resulting from approval of this well. The well may be safe, but the waste will still be transported through our neighborhoods.

That transportation poses a threat. Trucks and trains that will transport the hazardous waste will pass schools, hospitals, senior citizen complexes and our homes.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. Such a determination does not exempt EDS from other applicable requirements or take the place of applicable requirements governing transportation of wastes. EPA notes that Michigan's Part 111 construction permit, with its attachments, confines trucks transporting wastes to a route which avoids sensitive areas.

5. Comment: If there were a major catastrophe at the well, what would be the effect on the airport, how would it be evacuated?

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. Such a determination does not exempt EDS from other applicable requirements or take the place of applicable requirements governing activities in the area. While there are preparedness and prevention, and contingency plan and emergency procedure requirements that would be addressed as part of the RCRA hazardous waste treatment, storage, and disposal facility license EDS is seeking from the State, and while the airport might be subject to other requirements, such requirements are not administered through an exemption from the LDR for deep well injection.

That said, there are a number of safeguards imposed in the SDWA UIC permits for the wells. If a leak occurred in an injection well, it will be discovered immediately due to continuous monitoring and appropriate safety measures can be taken. This would include shutting down the well, contacting EPA, and proceeding with remedial action. Due to the supplemental safeguards required for Class I injection wells, it is extremely unlikely that any waste injected would exit the well anywhere other than the approved injection interval.

The waste unloading will be managed within a closed building designed to contain any materials which might be air pollutants. Moreover, the EPA and MDEQ permits prohibit the injection of ignitable and reactive wastes.

Please also note that the EDS wells will need an operating license from the State under RCRA before they can begin operations. The exemption is a separate and additional requirement. The Emergency Contingency Plan is part of the Hazardous Waste Management Facility (Part 111) license that would be issued by the MDEQ in Michigan.

6. **Comment:** Up to fifty 13,000-gallon tankers will arrive each day to dump their loads at the EDS facility. Interstate 94 was not built to accommodate this increase. The 1,600 additional trucks which will bring waste to the EDS facility each month will certainly cost additional taxpayer money to repair roads, but our property value will decrease due to negative impacts.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. Such a determination does not exempt EDS from other applicable requirements or take the place of applicable requirements governing transportation of wastes. The Part 111 construction permit issued by the MDEQ for the waste management facility limits the number of tank trucks which may arrive each day to 26. This means that if trucks arrive every day of the month, then no more than 806 trucks would arrive.

In addition, the EDS facility will be limited to a long-term average rate of 166 gpm under the exemption. Therefore, on an average day, the number of such trucks containing 13,000 gallons would have to be fewer than 19. Any waste delivered by rail would reduce the number of trucks still lower because the train tracks run directly into the containment building at the EDS facility.

7. **Comment:** The local communities have no means to manage a spill. An air release could affect a 15-mile radius.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. Such a determination does not exempt EDS from other applicable requirements. As mentioned above, EDS is seeking a license from the State for operation of a RCRA treatment, storage and disposal facility that would address preparedness and prevention, and contingency plan and emergency procedure requirements, and may include some air monitoring requirements. Other requirements may apply as well. For example, in the case of certain spills or releases, there may be reporting and other requirements under other statutes. Please note as well that the EDS facility has a system which maintains the pressure in the building at a lower level than atmospheric pressure. As a result, outside air moves into the building. Contaminants and odors should not leak out. In the event of a spill on the EDS site, the provisions of the Contingency Plan in the Part 111 license EDS still needs to operate would be implemented. Clean up of spills in the course of transportation to the site is regulated under the State analog to 40 CFR § 263.31 and is the responsibility of the transporter.

8. **Comment:** The commercial disposal wells in most other states are located in very rural settings. Wayne County is the most heavily populated county in the State. The well is located near I-94, I-275, and the Detroit Metropolitan Airport.

A hazardous waste spill would wreak havoc on our region and southeastern Michigan. A majority of the hazardous waste stream at the EDS facility would come from out of State. This waste would have to be transported to the disposal site through the Downriver region, Wayne County, and the State of Michigan. There are associated risks of accidents and spills. This is an unacceptable risk to the community.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. The regulations promulgated under SDWA with respect to siting of Class I hazardous waste injection wells focus on the injection depth (beneath the lowermost formation containing within one quarter mile of the well bore an underground source of drinking water) and hydrogeologic and geologic conditions (See 40 CFR § 146.61). In Region 5, there are hazardous waste injection wells located in urban settings such as Holland and Kalamazoo, Michigan; Gary and Burns Harbor, Indiana; and Lima, Ohio. There are facilities using injection for the commercial disposal of hazardous wastes located in Houston, Deer Park, and Corpus Christi, Texas. Waste injection at these locations has not resulted in environmental contamination.

Class I hazardous waste injection wells inject into formations deep below the surface of the earth far from USDWs; and the exemption determination under 40 CFR Part 148 addresses the containment of the wastes within the injection zone. Based on its review of the petition, EPA has determined that the proposed EDS injection meets the standards and requirements for such an exemption and is protective of human health and the environment. As discussed above, the granting of an exemption from the LDR on deep injection wells does not exempt the petitioner from other requirements and does not supplant other requirements that might apply to other activities associated with the wells, such as transportation of waste.

9. Comment: Will EPA address concerns regarding hazardous waste storage and if so, will there be any focus at all on the safety of storage sites?

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. Hazardous waste storage will be addressed in the State's review of EDS's application for a hazardous waste treatment, storage or disposal facility operating license.

10. Comment: Consider that Romulus is already dealing with contaminated air because of the pollution from tons of expelled hydrocarbons from daily jet exhaust.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C.

Those requirements are limited to the deep injection and containment of hazardous wastes in the injection zone.

11. Comment: This industrial area seems to have high rates of cancer, heart disease, and MS already.

Response: The exemption determination is based on the criteria at 40 CFR Part 148 subpart C. EDS has demonstrated, to a reasonable degree of certainty, that there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous pursuant to 40 CFR Part 148 subpart C. Based on its review of the petition, EPA has determined that the proposed EDS injection meets the standards and requirements for such an exemption and is protective of human health and the environment.

XXV. Michigan as a Dumping Ground for Canadian Waste

1. Comment: EPA has allowed Canada to use Michigan as a massive dump for trash despite an agreement signed by both countries in 1992. EPA has been asked to enforce an agreement that could put a stop to millions of tons of Canada's garbage, but thus far has declined to do so. Canada should deal with their waste in their own country.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. As discussed above, an exemption granted under that part is limited to those LDR.

2. Comment: When will the U.S. be allowed to transport our wastes to Canada?

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. As discussed above, an exemption granted under that Part is limited to those LDR. Michigan does export wastes to Canada. The MDEQ now compiles a report which summarizes the amounts of waste imports and exports. This report is titled: State of Michigan's Environment: Second Biennial Report. It can be found on the internet at: http://www.deq.state.mi.us/documents/deq-osep-ftp-deqdnrei03.pdf.

XXVI. Civil Rights Claims

1. Comment: EDS will violate my civil rights to live in a neighborhood free of the worry of hazardous waste polluting the city. The EDS facility will result in a negative impact on the quality of life for the people in Romulus and throughout the Southeastern Michigan region.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. As discussed above, an exemption granted under that part is limited to those LDR. EDS has demonstrated, to a reasonable degree of certainty, that there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous pursuant to 40 CFR Part 148 subpart C. Based on its review of the petition, EPA has determined that the proposed EDS injection meets the standards and requirements for such an exemption and is protective of human health and the environment. EPA disagrees with the commentor's conclusion that hazardous waste injected into the EDS wells will pollute the City of Romulus. Moreover, this is not the appropriate forum for defining, bringing, or arguing civil rights claims. EPA's Office of Civil Rights has previously addressed the complaint filed under Title VI of the Civil Rights Act of 1964 (Title VI) with respect to the State construction permits.

XXVII. Michigan Waste Management Capacity

1. Comment: No waste generators in Michigan have come forward to express a need or desire for this type of hazardous waste disposal. As it is, some of Michigan's hazardous waste facilities are closing due to lack of business, and many others are currently operating at 50 percent capacity. There is another facility 125 miles away working at 80% of capacity, why isn't the waste shipped to that facility?

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. As discussed above, an exemption granted under that Part is limited to those LDR. The issue of whether additional injection capacity is necessary is not a criterion for an exemption under 40 CFR Part 148 subpart C.

XXVIII. Effects of EDS's Operations on Business and Property

1. Comment: The people of Romulus have not given permission for the disposal of waste beneath their properties. Therefore, the permits should be revoked and the exemption denied. At the least, they should be paid a royalty.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. As discussed above, an exemption granted under that Part is limited to those LDR. This determination does not exempt the petitioner from other applicable requirements or approvals.

2. **Comment:** The sinking of this well will immediately destroy property values in the local area causing hardship, loss of income and real estate worth to thousands of Romulus residents. Local political establishments will be able to buy up real estate for "The Pinnacle" construction project. Unfair enrichment of unscrupulous businessmen and politicians will take place at the tax payers' expense. The people of Romulus will be robbed of their property.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. As discussed above, an exemption granted under that Part is limited to those LDR. EPA based its determination on the criteria at 40 CFR Part 148 subpart C, which does not address real estate transactions.

3. **Comment:** The federal government has destroyed the worth of the homes in the local area and must declare eminent domain and pay the market price to the inhabitants of the region, excluding Wayne County, the State of Michigan, and the Detroit Metropolitan Airport and Authorities.

Response: EPA is only granting an exemption to the LDR. A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. As discussed above, an exemption granted under that Part is limited to those LDR. Please note that the MDEQ stated in its response to comments in regard to the Part 111 permit that, "Notwithstanding the lack of a clear understanding of how property values might be impacted, the DEQ is requiring EDS to honor its commitment to compensate all residents within a one and one-half mile radius of the facility for property value losses attributable to the facility, as described in the Community Agreement, Attachment 13 to the permit."

4. **Comment:** SPMT asserts that by virtue of first obtaining permits, it has the prior right to use the Mt. Simon formation.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. As discussed above, an exemption granted under that Part is limited to those LDR. This is not the appropriate forum for arguing contract or property-law disputes that may happen to arise in the context of waste disposal activities for which federal permits, approvals, or authorizations are needed.

5. **Comment:** According to MDEQ, salt, a Michigan resource, under the MDEQ statute should be protected. The mission of the MDEQ is to drive improvement and environmental quality for the protection of public health and the natural resources to benefit current and future generations.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. As discussed above, an exemption granted under that Part is limited to those LDR. The injection zone does not contain any salt-bearing formations. The technical review of EDS's no migration petition concluded that the injection wells are constructed to prevent migration of injected fluids from the injection zone and into the salt bearing formations.

6. Comment: Please consider the impact on nearby businesses.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. These requirements do not address impacts on local businesses. As discussed above, an exemption granted under that Part is limited to the LDR for deep well injection.

7. Comment: The granting of the land ban is contrary to the laws of Michigan.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. As discussed above, an exemption granted under that Part is limited to those LDR, and does not preclude compliance with other laws. The commentor did not cite a specific law which land ban decisions violate.

XXIX. Public Opinion

1. Comment: Many politicians and corporate groups as well as individuals oppose the location of a hazardous waste management facility in Romulus. The region's image suffers as a result of the disposal facilities already here; the addition of more facilities, particularly a different type of facility, will be more harmful.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. As discussed above, an exemption granted under that Part is limited to the LDR. The requirements at 40 CFR Part 148 subpart C, while providing for public comment, limit the Agency's decision to specific criteria, which do not include community acceptance.

2. Comment: The exemption turns the backyards of the people in Romulus into hazardous waste storage sites.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. As discussed above, an exemption granted under that Part is limited to those

LDR. The only surface storage of hazardous waste will be at the RCRA-regulated facilities. At the EDS facility, limited amounts of hazardous waste will be stored above ground at any time. Waste will be injected into a rock layer at a depth of 3,900 feet soon after its arrival. It will remain at least 3,600 feet below the ground surface for at least 10,000 years.

3. Comment: The MDEQ and EPA do not have the citizens' best interests at heart. The most important issue is public safety. Citizens are not convinced that the public safety is being protected.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. As discussed above, an exemption granted under that Part is limited to those LDR. EDS has demonstrated, to a reasonable degree of certainty, that there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous pursuant to 40 CFR Part 148 subpart C. Based on its review of the petition, EPA has determined that the proposed EDS injection meets the standards and requirements for such an exemption and is protective of human health and the environment.

4. Comment: The City of Romulus has spent over a million dollars opposing the project. What will it take to make EPA realize that people do not want it here?

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. Those requirements do not include community acceptance. In reaching its decision on the petition, EPA has to act within the framework of RCRA and its implementing regulations.

5. Comment: If you lived here, would you be in favor of this project?

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. As discussed above, an exemption granted under that Part is limited to those LDR. EDS has demonstrated, to a reasonable degree of certainty, that there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous pursuant to 40 CFR Part 148 subpart C. Based on its review of the petition, EPA has determined that the proposed EDS injection meets the standards and requirements for such an exemption and is protective of human health and the environment.

XXX. Environmental Justice

1. Comment: The continued funding of the well by Detroit, a predominantly black and lower class city, is a racially and politically motivated attack on the city of

Romulus, a predominantly middle class and white community. It is a violation of the civil rights of the people of Romulus and serves as a continued support to the corrupt and questionable political practices that have run rampant in Detroit.

Response: A determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C. As discussed above, an exemption granted under that Part is limited to those LDR. EDS has demonstrated, to a reasonable degree of certainty, that there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous pursuant to 40 CFR Part 148 subpart C. Based on its review of the petition, EPA has determined that the proposed EDS injection meets the standards and requirements for such an exemption and is protective of human health and the environment. This is not the appropriate forum for arguing civil rights claims. The commenter should address any concerns about the violation of civil rights to EPA's Office of Civil Rights. That office has previously addressed claims under Title VI for the EDS construction permit.

XXXI. State Permit to SPMT for an Extraction Well

1. Comment: Commentors argue that since SPMT has obtained a permit the hypothetical conflict has become a reality.

Response: EPA disagrees. At the current time, SPMT has a permit to drill and operate up to a depth of 4,450 feet, which would include the EDS injection zone; but EPA does not know how deep the actual well will be, if it is drilled, or from which formations brine will be extracted. Indeed, SPMT's State approval for drilling a well to check for brine producing capacity is limited to the depth of the base of the Lockport Formation, about 2,227 feet below the surface, which is above the maximum extent of hazardous waste movement under the demonstration. At the present time, there is no well extracting from the injection zone, and EDS has demonstrated to a reasonable degree of certainty that its wastes will not leave the injection zone under current conditions. A State court has required SPMT to seek approval after it conducts testing of the Lockport Formation before it can drill deeper than that formation. An extraction well drilled and operated in the Lockport Formation will not affect EDS's demonstration.

Based on the information available, the EPA can make a reliable prediction that SPMT will not extract from the injection zone if EDS injects into that zone. SPMT's description of its proposed use of the brine extracted from the Mt. Simon has been sketchy. By letter dated March 28, 2003, SPMT indicates that SPMT can support a multi-year 1 million barrel cavern expansion effort utilizing only a single injection well with a target rate

below 200 gpm and that, in subsequent years, SPMT can operate the expanded cavern system with brine injection and production rates below 200 gpm and that the rates can be achieved at injection pressures below the fracture point of the formation. The May 29, 2003 State permit requires SPMT to obtain approval of a plan to test the Lockport Formation for brine production between the approximate depths of 2,120 and 2,140 feet prior to commencing to drill the well. Under the permit, the plan must specify the methods, materials, and procedures used to test the Lockport Formation; identify criteria for determining whether to continue the test at various key points; and establish the criteria for determining if the Lockport Formation is suitable for commercial brine production. In the November 19, 2003 proceedings before the Circuit Court of Ingham County on the May 29, 2003 State permit, the court made it clear that SPMT has to complete its testing and obtain the court's approval before it can drill below the Lockport Formation. Moreover, the State's November 20, 2003 approval of SPMT's plan to test the Niagara Group (the Lockport Formation) for brine concludes that if the step-rate injectivity test shows the well capable of receiving brine at a rate of at least 175 gpm, SPMT will complete the well in the Niagara Group interval and utilize it for both brine supply and injection, and will not drill to or utilize the Munising Group or Mt. Simon formation for these purposes. The plan submitted to the State on behalf of SPMT for evaluating the Niagran indicates that brine production is possible from the White Niagran, and references the Michigan Mineral Resource supply well production of 135 gpm from 3 porosity stringers which have a maximum of 28% porosity. On May 16, 2003, EDS sent EPA the results of an analysis of the native Mt. Simon Formation water which indicates that the Mt. Simon has a salt saturation level of approximately 60% and the White Niagaran would be a better choice for balancing in salt caverns utilized for LPG storage.

Furthermore, injection by EDS would make SPMT's brine extraction proposal impractical. The May 29, 2003 State permit provides that if SPMT's extraction well is completed in one or more Cambrian Geologic horizons below 3,900 feet and EDS begins hazardous waste disposal at its Citrin Drive facility, SPMT must immediately begin a program of testing the produced brine for specific chemical components present in the EDS wastes or a marker compound approved by MDEQ for injection with the EDS wastes, conduct testing every 15 days, and manage all produced brine as a hazardous waste until results of the required testing demonstrate to MDEQ's satisfaction that it is not hazardous waste.

EPA has a reasonable degree of certainty that SPMT will not extract if EDS injects hazardous waste. It is SPMT's extraction that will draw up injected wastes; SPMT noted in its October 6, 2003 comments that injected hazardous waste would render the brine unsuitable for production; and extraction after EDS injects will require SPMT to comply with expensive

requirements under its State permit. If SPMT has to treat their extracted brine as hazardous they will have to pay increased costs for handling the brine pursuant to hazardous waste requirements. In addition, if the brine actually is hazardous, SPMT would not be able to place it back on the land without an exemption from or treatment to LDR levels, much less use it for cavern expansion. Since EDS will be injecting listed hazardous waste, the presence of any of the waste in the extracted brine would render the brine subject to regulation as a hazardous waste under the contained in principle (unless SPMT were to obtain a contained out determination). As such, it would have to be treated to LDR levels and, even after such treatment, would remain a listed hazardous waste. This raises the question of whether SPMT would be able to use the material for the intended commercial purposes – essentially a question of whether any use would be viewed as legitimate or sham recycling. Hence, in addition to the increased costs to SPMT, the extraction of brine from the Mount Simon formation following injection of hazardous waste by EDS would engender significant regulatory complexities, which might bar SPMT's intended use of the brine. Indeed, in proceedings before the Circuit of Ingham County on June 16, 2003, the State indicated that SPMT would be prohibited from pumping out because they would, in fact, be creating a situation where there was hazardous waste, that they would be a hazardous waste generator at that point in time, so they would probably be the entity that would be required to shut down. While SPMT noted that the permit does not explicitly say that they have to shut down, it admitted that it does not want to become a party that is in the business of generating hazardous waste, and that the permit says that would be the effect. (Transcript of 6/16/03 proceedings at pp.17-18) Moreover, if SPMT ever does extract, the Agency might consider taking appropriate action to address such extraction.

2. **Comment:** Commentors declared that logic, physics and principles of hydrology dictate that simultaneous operation will have adverse results, and indicated that EDS's waste will migrate towards the SPMT extraction well within years.

Response: EPA agrees that if SPMT starts extracting from a well in the injection zone within the area of review, the EDS waste will be drawn towards such an extraction well. There currently is no extraction well in the injection zone within the area of review, however, and EPA can make a reliable prediction that SPMT will not extract from the injection zone if EDS injects. If an extraction well begins extracting from the injection zone, EDS will have to cease its injection under this exemption, and will be allowed to resume only if it can demonstrate no migration considering extraction by SPMT.

3. **Comment:** Commentors maintain that EDS has not met the burden of the demonstration required under 40 CFR § 148.20.

Response: The Agency disagrees and has determined that EDS submitted a petition that successfully made the demonstration that injected fluids will not migrate within 10,000 years vertically upward out of the injection zone or laterally within the injection zone to a point of discharge or interface with a USDW. Under current conditions this demonstration remains valid.

4. Comment: Commentors argue that EDS's petition does not adequately consider the effects of the permitted SPMT extraction well.

Response: EPA has considered the impact of an extraction well and decided there is no threat of wastes migrating vertically upward out of the injection zone as long as an extraction well is not operating in the injection zone. The issuance itself of a permit for an extraction well does not impact the demonstration. The drilling of a well in the injection zone within the area of review will at most lead to transient, minimal movement, contemplated in the agency's preamble to the Part 148 regulations. (See generally 53 Fed. Reg. 28117, at 28130) It is only the extraction process which will draw up the waste and then only if the extraction takes place from the injection zone. Under current conditions, there is a reasonable degree of certainty that the waste will not migrate in 10,000 years. In considering the possibility that SPMT may eventually drill and operate a well in the injection zone, EPA had decided to include the condition it proposed in the Notice of Intent requiring EDS to terminate operations if an extraction well begins extracting from the injection zone within the area of review.

SPMT comments that EDS should have modeled for SPMT's extraction; but SPMT has provided few details about its plans for extraction and based on the information available EPA has modeled and found that it is the extraction from the injection zone that would draw up the waste. Given the capacity of the Lockport Formation, the requirements of the permit as modified by the State court and by the State's November 20, 2003 approval, and the impact upon SPMT's operations and costs, EPA has a reasonable degree of certainty that SPMT will not extract from the Mt. Simon if EDS injects into that formation.

5. Comment: Commentors maintain that EDS's operations will contaminate the zone from which SPMT is permitted to extract brine.

Response: SPMT's permit allows for drilling and extraction from a number of formations, not all of which fall within EDS's injection zone. At this time there is no extraction well drilled into the injection zone. The injection zone serves to contain the injected waste. EDS still needs a license from the State under RCRA for its above-ground operations that address RCRA corrective action before it can begin injecting hazardous wastes. The State will also oversee SPMT's extraction project and evaluate its sampling of the Lockport Formation for brine capacity. The State is in a better position

to balance the potential uses of geologic formations within its jurisdiction. EPA has concluded that based on conditions that exist at this time, EDS has demonstrated to a reasonable degree of certainty that the waste will not migrate out of the injection zone

6. Comment: Commentors claim that SPMT has been in the area longer.

Response: While other SPMT operations that are not impacted by the proposed EDS injection may have been there longer, SPMT's proposal to extract brine is a relatively new proposal. SPMT submitted an application to the State for a permit to extract after the State and EPA had granted EDS permits for its hazardous waste injection wells on Citrin Drive, although before EDS submitted a petition for an exemption from the LDR. In any case, a determination on a petition for exemption from the LDR for deep well injection is based on the requirements of 40 CFR Part 148 subpart C; and, as discussed above, an exemption granted under that Part is limited to those LDR. This determination does not bar SPMT or EDS from arguing their respective rights in a separate forum.

7. Comment: SPMT argues that there is no reason to issue an exemption EPA will have to terminate if SPMT extracts brine from the Mt. Simon Sandstone.

Response: Under conditions in existence at this time, EPA is granting the exemption pursuant to its regulations. It is not clear if or when the exemption would be terminated. That depends on conditions which have not occurred. For example, the Agency has determined that drilling and operation of an extraction well into the Lockport Formation within the area of review of the EDS wells would not impact the containment of waste within the injection zone.

8. Comment: SPMT says that it does not matter if it has not undertaken the testing required by the State permit, so long as that permit authorizes it to drill from several formations, including the Mt. Simon.

Response: Under this argument, a neighboring facility could stop a land ban determination by getting a permit before a petition was granted without actually acting on the permit. It is the operation of the extraction well in the injection zone, not the issuance of a broad permit covering several formations, that changes the projected flow of fluids for the EDS petition. Moreover, a State court has required SPMT to obtain further approval after the testing of the Lockport formation before it can drill deeper than that formation.

9. Comment: SPMT also maintains that Congress intended that the reasonable degree of certainty standard demonstration include reasonably predictable future events.

Response: While certain geological events can be predicted, it is more difficult to predict human activity. SPMT, for example, may decide to complete its well in a shallower formation. As another commentor has noted, SPMTs well has not been built and may never be built. If SPMT's well is ever built and operated in the injection zone, the Agency can reconsider this decision in light of the facts that exist at that time. As discussed above, EPA can make a reliable prediction that SPMT will not extract from the injection zone if EDS injects into that zone. A State court has required SPMT to obtain further approval before it can drill to the depth of the injection zone, SPMT cannot drill further if the Lockport has adequate brine capacity, SPMT's plan indicates that brine production is possible from the Lockport, extraction from the Lockport will not affect the demonstration, and, the terms of the State extraction well permit, among other things, will make extraction from the Mt. Simon impractical.

10. Comment: Another commentor critiques the engineering and economic feasibility of SPMT's proposal, and suggests that SPMT would be better off drilling horizontally within the Lockport Formation to extract a fully saturated salt brine. This comment highlights the impracticability of extracting brine from the Mt. Simon, noting that the composition of the native Mount Simon water sampled in the area was not saturated, and estimates that the permeability of the White Niagaran formation from the porosity and permeability in the Brown Niagaran formation, to indicate that a 2,000 foot horizontal well in the White Niagaran could sustain SPMT's needs.

Response: This comment highlights the impracticality of extracting from the Mt. Simon and suggests that the Lockport Formation will have adequate capacity for SPMT's purposes. EPA considered the State permit and has decided that mere issuance of a permit for extraction in the area of review will not bar granting of the land ban exemption. Extraction from the Lockport Formation will not affect EDS's demonstration, and EPA can make a reliable prediction that the extraction well will not extract from the Mt. Simon if EDS injects hazardous waste into that formation.

11. Comment: Another commentor argues that EDS has met the requirements for an exemption and its petition deserves due and timely consideration.

Response: EPA agrees.

12. Comment: The petitioner argued that the regulations bifurcate the 10,000 year demonstration into two showings: 1) that the waste will not move through natural processes up out of the injection zone or laterally to a USDW; and 2) that existing man made conduits that penetrate the confining and injection zone have to be identified and addressed through the SDWA corrective action requirements and future man-made conduits through the

post-closure requirements by alerting local officials. Under this theory, a hazardous waste injection well can meet the no migration demonstration even if the waste is being extracted up out of the injection zone through a man-completed extraction well.

Response: EPA disagrees. Such a reading of the regulations is inconsistent with the clear directive in the statute that a method of land disposal may not be determined to be protective of human health and the environment (except hazardous waste pretreated pursuant to RCRA Section 3004(m)) unless, upon application by an interested person, it has been demonstrated to a reasonable degree of certainty that there will be no migration of hazardous constituents from the disposal unit or injection zone for as long as the wastes remain hazardous. It is also inconsistent with the preamble language indicating that the corrective action requirements are in addition to and not instead of the no migration standard, which is more stringent; and referencing conduits as being a major concern for migration. Migration can stem from man-made as well as natural causes. The petitioner suggests that EPA made a conscious choice in promulgating the regulations to limit migration to migration through natural forces, but EPA did not express such a choice in its preamble. If SPMT begins operating an extraction well in the injection zone within the area of review, thereby creating conditions such that EDS's waste will migrate upward out of the injection zone, the exemption terminates. It does not matter that the conditions are triggered by a man-made event. EDS must also comply with SDWA corrective action requirements under 40 CFR § 148.20, in addition to the demonstration requirement.

13. Comment: The petitioner also argues that Michigan is the governing authority and that SPMT is responsible for ensuring that the waste does not leave the injection zone.

Response: Michigan regulates extraction wells, which EPA does not regulate, and is authorized for most RCRA requirements; but it does not have primacy for the SDWA and is not authorized for the 40 CFR § 148.20 exemption determination. EPA must make the 40 CFR § 148.20 exemption determination. That said, EDS still needs a license from Michigan under RCRA for its treatment, storage, and disposal activities that must include RCRA corrective action requirements. EDS did not provide a citation for its assertion that SPMT would be responsible for ensuring that the hazardous waste remains in the injection zone. This is not what the State permit says. Under EPA's land ban determination, EDS's exemption will be terminated before waste can leave the injection zone. EDS is also subject to the SDWA corrective action obligations under its exemption and its federal SDWA permit as well as the post-closure requirements, and will be subject to corrective action requirements under the State RCRA license it still needs in order to operate its facility.

CONCLUSIONS

EDS has demonstrated, to a reasonable degree of certainty, that there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous pursuant to 40 CFR Part 148 subpart C. Based on its review of the petition, EPA has determined that the proposed EDS injection meets the standards and requirements for such an exemption and is protective of human health and the environment. None of the comments received would cause EPA to set aside these findings under current conditions. EPA's interpretation represents a reasonable accommodation of manifestly competing interests and is entitled to deference: the regulatory scheme is technical and complex, the agency considered the matter in a detailed and reasoned fashion, and the decision involves reconciling conflicting policies. (See Chevron, at 865.)